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ANNUAL SUMMARY, 1899.

INTRODUCTION.

The present annual summary completes the discussion of the meteorology of India for the year 1899.

It should be noted that in the monthly reviews it is attempted to present the facts and data from two different points of view. Meteorological data in India are chiefly utilized for the following purposes:—

1st.—In the discussion of the prevalence and spread of diseases, more especially of cholera and other diseases of an epidemic character.

2nd.—In connection with agricultural questions, more especially the progress and character of the crops as determined by the weather conditions of the period.

India has hence been divided into two groups of divisions from what may be termed the medical and agricultural stand-points. For the comparison of medical and meteorological statistics, India is arranged into the following provinces, which are believed to be fairly homogeneous so far as the conditions of the prevalence of the more common diseases are concerned:—

- (1) Burma Coast and Bay Islands.
- (2) Burma Inland.
- (3) Assam.
- (4) Bengal and Orissa.
- (5) Gangetic Plain and Chota Nagpur.
- (6) Upper Sub-Himalayas, including the sub-montane districts of the North-Western Provinces and the Punjab and the meteorological divisions of the South-East, South, Central and North Punjab.
- (7) Indus Valley and North-West Rajputana.
- (8) East Rajputana. Central India and Gujarat.
- (9) Deccan.
- (10) West Coast.
- (11) South India.

The data for each of these divisions are given in Table I in large figures, and the portion of each monthly review, entitled, "Summary of the chief features of the weather in India during the month," is intended to give a sketch of the broader and more important features of the weather in India for the use of those who study the relations between the prevalence and spread of diseases and the weather conditions prevailing at the time in India.

According to the second method of arrangement, India is divided into 57 meteorological districts or divisions from the agricultural standpoint, each of which is fairly

homogeneous so far as the distribution of rainfall and the general character of the crops and the conditions of their growth are concerned. The following gives the two series of divisions arranged under the respective political areas or provinces to which they belong:—

Political Division or Province.	Meteorological Division or District.	Meteorological Province.
BURMA . . .	Tenasserim and Bay Islands.	Burma Coast and Bay Islands.
	Lower Burma . . .	
	Arakan . . .	Burma Inland.
	Central Burma . . .	
ASSAM . . .	Upper " . . .	Assam.
	Assam (Surma) . . .	
	" (Brahmaputra) . . .	Bengal and Orissa.
	East Bengal . . .	
BENGAL . . .	Deltaic " . . .	
	Central " . . .	
	North " . . .	Gangetic Plain and Chota Nagpur.
	Orissa . . .	
NORTH-WESTERN PROVINCES AND OUDH.	Chota Nagpur . . .	
	South Bihar . . .	
	North " . . .	Upper Sub-Himalayas.
	North-Western Provinces East	
PUNJAB . . .	North-Western Provinces Central.	
	South Oudh . . .	
	North " . . .	
	North-Western Provinces East Sub-montane.	Indus Valley and North-West Rajputana.
BOMBAY NORTH . . .	North-Western Provinces West Sub-montane.	
	South-East Punjab . . .	
	South " . . .	
RAJPUTANA AND CENTRAL INDIA.	Central " . . .	East Rajputana, Central India and Gujarat.
	Punjab Sub-montane . . .	
	North Punjab . . .	
	West Punjab . . .	
RAJPUTANA AND CENTRAL INDIA.	Sind . . .	Indus Valley and North-West Rajputana.
	West Rajputana . . .	
RAJPUTANA AND CENTRAL INDIA.	Central India, East . . .	East Rajputana, Central India and Gujarat.
	Rajputana East, Central India West.	

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Political Division or Province.	Meteorological Division or District.	Meteorological Province.
BOMBAY NORTH . . .	Kathiawar . . .	East Rajputana, Central India and Gujarat.
	Gujarat . . .	
NORTH WESTERN PROVINCES.	North-Western Provinces West.	
BOMBAY . . .	Bombay Deccan . . .	Deccan.
	Khandesh . . .	
BERAR . . .	Berar . . .	
CENTRAL PROVINCES.	Central Provinces West	
	„ „ Central	
	„ „ East	
HYDERABAD OR THE NIZAM'S DOMINIONS.	Hyderabad North	
	„ South	
BOMBAY . . .	Konkan . . .	West Coast.
	Malabar . . .	
MADRAS . . .	Madras South	
	„ „ Central	
	„ East Coast South	
	„ Central	South India.
	„ East Coast Central	
COORG AND MYSORE.	Coorg . . .	
	Mysore . . .	
HILL DISTRICTS . . .	Assam Hills . . .	Hills.
	Bengal „ . . .	
	North-Western Provinces Hills.	
	Punjab Hills . . .	
	Baluchistan Hills . . .	

The double grouping is shown in Plate I at the end of this summary.

The data of Table I in the monthly reviews and in the present annual part are obtained, with a few exceptions, from the observations telegraphed daily to Simla for publication in the Daily Weather Report. In the case of thermometric observations, they are telegraphed to the nearest half degree. Hence the maxima and minima temperature data of the second class observatories derived from these telegraphic reports and given in that table occasionally differ to some slight extent from the means of the more exact data (recorded to tenths of a degree) tabulated in the observation forms sent into the Calcutta Office, and which are used in the calculation of the mean temperature data in Table II. There is also another reason why the mean maxima and minima data in Tables I and II differ to a slight extent. In Table I the daily or 24 hours' period is assumed to end at 8 A.M., and in Table II at 4 P. M., and hence the maximum temperature in Table I for any month of thirty-one days at any station gives the mean for thirty-one periods of 24 hours ending at 8 A.M. of the 31st, and in Table II for the same number of 24 hours' periods ending at 4 P.M. on the 31st, and hence virtually of a monthly period one day in advance of the former. Similarly, for months of 28, 29 or 3 days. These remarks will explain some of the slight discrepancies which may be found between the maxima and minima temperature mean data in Tables I and II, and hence also in the monthly mean variation data given in these tables in the monthly reviews and annual summary.

The methods of exposure of the instruments at observatories in India, and of the reduction of the observations and the calculation of mean data, have been fully stated and explained in the Annual Reports on the Meteorology of India, and need not be repeated. The reader is referred more especially to the Annual Report of the year 1885 and to the "Instructions to observers of the Indian Meteorological Department" for full information on this subject.

Temperature.

The methods of exposing the thermometers at observatories in India and of deducing the daily and monthly means from the observed readings of the instruments are described in pages 18-19 of the Annual Report for 1890.

The variations of the mean temperature of each month from the normal given in Table II of the monthly reviews are deduced by a comparison of the actual monthly means with the normal monthly means obtained by the same methods given in Table XII of average monthly temperatures of 87 stations in India and Ceylon, etc., in pages 19 to 22 of the Annual Report for the year 1890. Average data for 134 stations will also be found in pages 39 to 42 of the Annual Report for the year 1887.

Average or normal monthly temperatures of 82 second class stations were recently re-calculated and the whole of the data up to December 1896 utilized for the determination of these values. These normal means were given in Table I of the Annual Summary for 1895.

The variations obtained by a comparison of these normal means with the actual monthly means in Table II of the monthly weather reviews for the year are given in Table I.

The mean variations given in Table II of the Geographical Summary are derived from the variation data of Table II of the monthly weather reviews of the year 1899.

In Table I published in each monthly review, as in the Daily Weather Report, the mean temperature of the day is calculated by the formula, daily mean = $\frac{\text{Maximum} + \text{Minimum}}{2}$.

It differs from the true daily mean by amounts varying slightly with the season. The variations of the daily or monthly actual means obtained by this method from normal daily or monthly means similarly calculated, usually differ very little from those obtained by the more laborious computation of true daily means and the comparison of these with normal true daily means. In Table I of the monthly weather reviews of the year 1899 the variations of the monthly mean maxima and minima temperatures from the normal, as well as the variations of the monthly mean temperatures (i.e., $\frac{\text{Maximum} + \text{Minimum}}{2}$), are given.

Normal monthly mean maxima and minima temperatures of 94 stations calculated from the observations of the eleven years' period, 1878—1888, were given in the Annual Summary for 1891. The additional data for the years 1889—1893 have been recently utilized to furnish what are

probably slightly more accurate means than those given in the 1891 Annual Summary. The re-calculated means were given in the 1894 Annual Summary, Tables I and II, and need not be repeated here.

Tables II and III(a), III(b) and III(c) give summaries of the temperature variation data for each month of the year 1899 and for the year. In the first table (Table II) the same division has been adopted as that employed in the Annual Reports from 1881 to 1890. This enables an exact comparison to be made of the temperature data of the year 1899 with those of previous years given in the Annual Reports. In the second set of tables [Table III(a), III(b) and III(c)] the variation data are given for the eleven meteorological provinces into which the empire is divided for the purpose chiefly of comparing meteorological and health statistics, and in the last table (Table IV) the data are given for 54 of the 57 smaller divisions or areas into which India is sub-divided with a view to the comparison of meteorological and crops statistics—

TABLE I.—Comparison of monthly mean air temperatures in 1899 with the averages of past years.

METEOROLOGICAL PROVINCE.	STATION.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	YEAR.
		°	°	°	°	°	°	°	°	°	°	°	°	°
BURMA COAST AND BAY ISLANDS.	Port Blair .	+1.0	+0.3	+0.5	-0.9	+0.1	-0.3	+1.7	+1.5	+0.1	+1.2	-0.1	-0.2	+0.4
	Rangoon .	0	-0.7	+1.5	-0.1	-2.6	-0.3	+0.7	+0.1	+0.9	+1.1	-1.5	-1.4	-0.2
	Diamond Island	+1.6	+0.5	+1.0	+0.5	-0.7	+1.0	+2.1	+2.0	+1.8	+2.2	+0.2	-0.3	+1.0
	Cocos Island .	+2.7	+1.0	+0.7	?	+0.9	+0.9	+1.4	+1.7	+1.7	+1.8	+0.9	+0.2	+1.3
	Akyab .	-1.6	+0.6	+1.4	+0.3	-0.6	+0.3	0	+1.2	+0.6	?	?	?	?
BENGAL AND ORISSA.	Chittagong .	-1.5	+0.6	+1.1	-0.3	+0.9	-0.8	-0.2	+1.2	+0.6	-0.1	-2.4	-1.5	-0.2
	Calcutta (Alipore)	-2.2	+1.1	+2.4	+0.5	+1.1	-0.3	+0.1	+1.9	+2.2	0	-0.9	+0.8	+0.6
	Saugor Island .	-2.3	+0.5	+1.4	-0.3	-0.1	-1.0	+0.1	+1.4	+1.4	-0.6	-1.8	+1.1	0
	False Point .	-1.0	+0.7	+0.7	-0.7	-0.4	-1.2	-0.3	+1.7	+1.8	-0.1	-1.5	+0.4	0
GANGETIC PLAIN AND CHOTA NAGPUR.	Hazaribagh .	-3.5	+0.6	+3.3	-0.3	+0.5	+0.9	-1.1	+1.9	+2.1	+1.6	+1.3	+2.0	+0.8
	Darbhanga .	-3.5	+1.1	+1.5	-2.2	+2.1	-0.8	-1.6	+0.7	+0.8	+0.2	-1.5	-0.7	-0.3
	Allahabad .	-4.1	+1.4	+1.6	-0.6	+1.5	-2.3	-3.0	+0.9	+0.6	-0.2	+0.2	+1.6	-0.2
	Dehra Dun .	-3.7	+0.7	+2.5	-1.8	+0.9	-2.3	-2.0	+0.6	+0.3	+0.5	+0.6	+0.6	-0.3
UPPER SUB-HIMALAYAS.	Roorkee .	-4.2	+1.2	+3.1	-0.5	+2.0	-2.7	-1.9	+2.0	+2.0	+0.7	+0.3	+0.6	+0.2
	Meerut .	-2.6	+1.7	+3.6	+0.6	+5.2	-3.1	-1.4	+3.7	+3.2	+1.2	+1.9	+3.0	+1.4
	Lahore .	-1.2	+4.0	+5.1	+1.3	+6.5	+1.1	+3.4	+5.0	+5.2	+1.9	+4.6	+5.7	+3.6
	Ludhiana .	-2.3	+3.3	+5.0	+0.2	+5.7	-0.3	+1.3	+3.6	+4.8	+1.4	+2.8	+3.7	+2.4
INDUS VALLEY AND NORTH-WEST RAJPUTANA.	Peshawar .	-1.6	+2.1	+2.8	+0.8	+4.8	+2.1	+1.8	+1.3	+1.6	+0.5	+3.0	+3.4	+1.9
	Jacobabad .	-2.2	+2.6	+2.4	+1.3	+3.3	+1.3	+1.5	+1.7	+1.0	+1.1	+4.1	+4.7	+1.9
	Kurrachee .	-2.4	+1.3	-0.1	+2.5	+1.7	+0.6	+0.2	+1.6	+0.3	+0.1	+2.1	+4.6	+1.0

TABLE I.—Comparison of monthly mean air temperatures in 1899 with the averages of past years—contd.

METEOROLOGICAL PROVINCE.	STATION.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	YEAR.
EAST RAJPUTANA, CENTRAL INDIA AND GUJARAT.	Jaipur . .	-2.3	+3.2	+3.8	+1.1	+2.6	-2.1	+0.5	+7.5	+4.5	+4.8	+4.2	+5.3	+2.8
	Deesa . .	-3.3	+1.7	+1.2	?	+0.3	-0.1	+3.8	+6.1	+4.7	+6.4	+4.6	+6.1	+2.9
DECCAN	Belgaum . .	-1.4	-0.4	+0.3	-3.0	-1.4	-0.6	+0.5	+0.9	+1.2	+2.6	+1.2	+1.6	+0.1
	Sholapur . .	-1.0	+0.6	+1.7	-2.2	-0.2	+0.8	+3.6	+4.2	+2.5	+5.0	+3.2	+2.3	+1.7
	Poona . .	-2.4	+0.5	+1.9	-2.7	-0.4	-0.6	+1.0	+2.2	+1.8	+4.7	+2.5	+1.8	+0.9
	Akola . .	-2.8	+1.2	+1.9	-1.1	+0.4	+1.1	+2.6	+4.8	+6.2	+6.3	+4.6	+4.8	+2.5
	Buldana . .	-1.9	+1.1	+2.8	-3.2	-0.8	-0.5	+1.9	+4.0	+4.9	+7.0	+5.6	+4.6	+2.1
	Khandwa . .	-3.4	+2.2	+2.2	+0.7	+0.6	+1.1	+1.6	+4.7	+6.1	+7.2	+5.5	+5.2	+2.8
	Nagpur . .	-1.9	+0.4	+2.3	-2.0	+0.4	+2.2	+2.0	+3.2	+4.6	+4.5	+3.9	+4.4	+2.0
	Hyderabad (Deccan).	-0.1	+1.0	+1.4	-2.5	-1.4	+1.3	+2.7	+2.9	+2.7	+3.8	+2.6	+1.6	+1.3
WEST COAST	Bombay . .	-1.5	+0.4	+0.7	-0.2	+0.4	-0.8	+1.2	+1.3	+1.4	+1.8	+0.3	+1.1	+0.5
	Karwar . .	-1.8	-0.5	+0.8	-1.2	-0.8	-0.6	+1.8	+1.1	+0.2	+1.6	-0.7	-1.0	-0.1
	Salem . .	-0.9	-0.1	-0.6	-3.7	-0.5	+1.5	+3.7	+4.1	+0.4	+1.4	+0.3	+0.2	+0.5
	Chitaldroog . .	-1.2	-0.3	0	-2.7	-0.4	+0.4	+2.6	+2.8	+0.8	+2.1	+2.1	+1.8	+0.7
SOUTH INDIA	Bangalore . .	0	+0.7	+0.3	-1.7	-0.8	+1.0	+3.3	+2.9	+0.6	+1.6	-0.7	-0.1	+0.6
	Hassan . .	-1.9	0	-0.7	-2.1	-0.3	0	+1.9	+1.8	+1.0	+1.6	-1.4	-1.0	-0.1
	Mysore . .	-1.6	+0.5	-0.9	-1.0	-0.1	-0.5	+1.8	+1.8	-0.3	+0.9	-1.0	-0.6	-0.1
	Madras . .	-0.7	-0.1	-0.7	-1.0	+0.3	+1.1	+1.8	+1.3	-0.7	-1.0	-0.4	-1.3	-0.1
	Bellary . .	-0.2	+0.9	0	-3.3	-0.4	+0.1	+1.8	+1.9	0	+1.9	+1.0	+1.0	+0.4
	Cocanada . .	+0.2	+1.3	+0.4	-0.4	-0.5	+1.6	+4.9	+2.4	+2.0	+1.0	-1.2	-0.3	+1.0
	Vizagapatam . .	-0.7	0	-0.4	-0.8	-0.5	-1.2	?	?	?	?	?	?	?
HILL STATION, BALUCHISTAN	Quetta . .	-2.2	+3.1	+2.8	-0.3	+1.5	0	-1.0	0	-1.5	-0.5	+3.1	+3.6	+0.7
	Leh . .	-13.8	-3.2	+1.5	-2.1	+4.0	+3.4	+1.1	-1.5	-1.4	+0.4	+0.3	+0.3	-0.9
	Srinagar . .	-4.9	+3.3	+4.9	-3.3	+1.0	+1.3	+1.6	-0.8	-1.4	+1.5	+0.7	+2.0	+0.5
HILL STATIONS, NORTHERN INDIA.	Kailang . .	-6.1	+1.0	+2.0	-1.0	+3.1	+3.0	+1.2	-0.9	-1.6	-1.0	-0.4	+0.9	0
	Simla (Ridge) . .	-4.1	+0.6	+3.3	-3.6	+0.4	-0.9	-1.1	+0.1	0	+0.8	+0.4	-0.5	-0.4
	Chakrata . .	-3.3	+1.5	+3.6	-3.9	+0.7	-1.1	-0.9	-0.2	+0.3	+1.8	+0.6	+1.3	0
	Ranikhet . .	-3.5	+0.8	+4.3	-3.1	+3.2	+0.1	-0.6	+1.1	+1.5	+0.9	+0.5	+0.3	+0.5
	Katmandu . .	-4.1	+1.2	+2.0	-1.2	+2.3	-0.7	-0.8	-0.7	0	-0.3	-1.3	-2.9	-0.5
	Darjeeling . .	-2.4	?	+0.3	-0.6	+2.4	+0.3	0	+0.9	+1.2	-0.3	-1.7	-0.8	-0.1
	Mount Abu . .	-2.8	+1.6	+2.2	-0.6	-0.6	0	+0.6	+3.4	+2.2	+4.4	+3.5	+4.3	+1.5
HILL STATIONS, CENTRAL INDIA.	Pachmarhi . .	-3.2	+0.7	+2.2	-0.5	+0.3	-0.2	-1.1	+3.2	+2.6	+4.2	+3.7	+3.5	+1.3
	Chikalda . .	-1.7	+1.3	+3.4	-2.3	-0.9	+0.5	-0.3	+2.0	+3.2	+6.8	+5.9	+4.9	+1.9

TABLE I.—Comparison of monthly mean air temperatures in 1899 with the averages of past years—concl'd.

METEOROLOGICAL PROVINCE.	STATION.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	YEAR.
		°	°	°	°	°	°	°	°	°	°	°	°	°
HILL STA- TION, SOUTHERN INDIA.	Wellington .	-0.3	+0.4	-0.5	-1.6	-0.5	-0.6	+1.0	+0.4	+0.2	+0.8	-1.2	-0.8	-0.2
	Aden . .	-0.7	-0.5	-0.2	-0.2	+0.2	+1.2	+1.8	+2.8	+0.9	-0.5	-0.2	+0.4	+0.4
EXTRA INDIAN STATIONS.	Perim . .	-0.5	?	-0.5	-0.2	-0.9	+0.1	-0.6	+0.4	-0.8	-0.3	-0.1	+0.6	-0.3
	Zanzibar .	+0.2	+0.5	-0.1	-0.3	-0.9	-0.8	-0.9	-0.5	-0.3	+0.1	+2.0	+0.5	0
	Port Victoria (Seychelles).	-1.1	-0.7	+0.2	+0.4	-0.3	-0.2	-0.4	-0.7	-1.1	-1.0	-0.5	-0.5	-0.5
	Mauritius .	+0.4	+0.7	+0.7	+0.7	+0.4	-0.6	+0.2	+0.2	+0.3	-0.6	+0.4	+1.1	+0.3

TABLE II.—Geographical summary of the temperature data of Table II in the monthly weather reviews of 1899.

METEOROLOGICAL AREA.	Number of stations.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	YEAR.
North-West Himalaya	6	-6.0	+0.7	+3.3	-2.8	+2.1	+1.0	+0.2	-0.4	-0.4	+0.7	+0.4	+0.7	0
Sikkim Himalaya and Nepal.	1-2	-3.3	+1.2	+1.2	-0.9	+2.4	-0.2	-0.4	+0.1	+0.6	-0.3	-1.5	-1.9	-0.3
Punjab Plains . .	3	-1.7	+3.1	+4.3	+0.8	+5.7	+1.0	+2.2	+3.3	+3.9	+1.3	+3.5	+4.4	+2.6
Gangetic Plain . .	5	-3.6	+1.2	+2.5	-0.9	+2.3	-2.2	-2.0	+1.6	+1.4	+0.5	+0.3	+1.0	+0.2
Western Rajputana .	3-4	-2.7	+1.8	+1.4	+1.1	+1.2	+0.5	+1.5	+3.2	+2.1	+3.0	+3.6	+4.9	+1.8
Eastern Rajputana and Central India.	1	-2.3	+3.2	+3.8	+1.1	+2.6	-2.1	+0.5	+7.5	+4.5	+4.8	+4.2	+5.3	+2.8
Nerbudda Valley . .	1	-3.4	+2.2	+2.2	+0.7	+0.6	+1.1	+1.6	+4.7	+6.1	+7.2	+5.5	+5.2	+2.8
Chota Nagpur . . .	1	-3.5	+0.6	+3.3	-0.3	+0.5	+0.9	-1.1	+1.9	+2.1	+1.6	+1.3	+2.0	+0.8
Lower Bengal . . .	2	-2.3	+0.8	+1.9	+0.1	+0.5	-0.7	+0.1	+1.7	+1.8	-0.3	-1.4	+1.0	+0.3
Orissa	1	-1.0	+0.7	+0.7	-0.7	-0.4	-1.2	-0.3	+1.7	+1.8	-0.1	-1.5	+0.4	0
Central Provinces South and Berar.	5	-2.3	+0.9	+2.5	-1.8	-0.1	+0.6	+1.0	+3.4	+4.3	+5.8	+4.7	+4.4	+2.0
Konkan	2	-1.7	-0.1	+0.8	-0.7	-0.2	-0.7	+1.5	+1.2	+0.8	+1.7	-0.2	+0.1	+0.2
Deccan. Hyderabad and Mysore.	9	-1.1	+0.4	+0.4	-2.4	-0.6	+0.2	+2.1	+2.4	+1.1	+2.7	+1.1	+0.9	+0.6
East Coast and Carnatic.	3-4	-0.5	+0.3	-0.3	-1.5	-0.3	+0.8	+3.5	+2.6	+0.6	+0.5	-0.4	-0.5	+0.4
Arakan and Pegu .	3-4	-0.4	+0.3	+1.3	+0.1	-0.8	+0.1	+0.7	+1.1	+1.0	+1.1	-1.2	-1.1	+0.2
Bay Islands . . .	1-2	+1.9	+0.7	+0.6	-0.9	+0.5	+0.3	+1.6	+1.6	+0.9	+1.5	+0.4	0	+0.8
Extra-Tropical India .	25-26	-3.5	+1.4	+2.6	-0.7	+2.1	-0.1	+0.2	+1.8	+1.7	+1.3	+1.2	+2.0	+0.8
Tropical India . . .	25-27	-0.9	+0.4	+0.8	-1.5	-0.4	+0.3	+1.7	+2.2	+1.6	+2.6	+1.1	+1.0	+0.7
Whole India	51-53	-2.2	+0.9	+1.6	-1.1	+0.8	+0.1	+0.9	+2.0	+1.6	+2.0	+1.2	+1.5	+0.8

TABLE III(a).—Variations of the mean monthly maximum temperature from the normal in 1899 in the eleven meteorological provinces of India.

METEOROLOGICAL PROVINCE.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	YEAR.
	°	°	°	°	°	°	°	°	°	°	°	°	°
Burma Coast and Bay Islands.	+0.8	-1.3	+0.7	-0.3	-3.0	+0.1	+0.5	+1.0	+1.2	+2.3	-1.1	-0.6	0
Burma Inland	0	-1.1	+1.1	+1.4	-3.1	-1.2	-1.1	+0.6	-0.1	-0.5	-2.3	-1.9	-0.7
Assam	-2.3	+0.7	+0.4	-1.4	+1.8	-2.4	-2.7	-0.6	-1.4	-1.4	-1.0	-3.4	-1.1
Bengal and Orissa . .	-3.0	+0.3	+1.8	-1.4	+0.8	-1.5	-0.4	+1.3	+1.6	-0.6	0	+0.2	-0.1
Gangetic Plain and Chota Nagpur.	-3.5	+1.8	+2.9	-2.7	-0.7	-1.5	-3.1	+1.7	+2.5	+2.8	+2.9	+2.6	+0.5
Upper Sub-Himalayas . .	-2.3	+2.4	+3.7	-1.4	+2.5	-1.6	-0.6	+5.3	+6.3	+3.0	+2.9	+3.7	+2.0
Indus Valley and North-West Rajputana.	-0.5	+3.1	+2.2	+1.5	+3.4	+1.3	+1.6	+2.8	+2.5	+1.2	+2.4	+4.0	+2.1
East Rajputana, Central India and Gujarat.	-2.1	+2.9	+3.0	-1.0	-0.5	-1.9	+0.3	+7.7	+6.2	+6.5	+5.6	+5.6	+2.7
Deccan	-0.7	+1.0	+2.4	-3.3	-0.9	+0.4	+2.0	+4.5	+5.8	+7.5	+7.1	+5.6	+2.6
West Coast	-0.9	-0.2	+0.3	-1.1	0	+0.3	+2.0	+2.0	+0.3	+1.3	+0.6	+1.3	+0.5
South India	-0.3	-0.1	+0.3	-3.5	-0.6	+1.3	+4.5	+3.4	+0.5	+1.2	+2.7	+2.2	+1.0

TABLE III(b).—Variations of the mean monthly minimum temperature from the normal in 1899 in the eleven meteorological provinces of India.

METEOROLOGICAL PROVINCE.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	YEAR.
	°	°	°	°	°	°	°	°	°	°	°	°	°
Burma Coast and Bay Islands .	-0.7	+0.6	+1.5	+1.7	+0.5	+0.5	+1.4	+1.3	+1.6	+1.2	-0.2	-0.7	+0.7
Burma Inland	-0.1	+0.2	+0.4	+1.6	+0.5	-0.1	+0.5	+1.0	+0.9	+1.6	-0.1	-2.0	+0.4
Assam	-3.0	-0.6	-0.6	-0.9	+1.9	-0.9	-0.2	+0.2	-0.2	-0.4	-1.3	-1.2	-0.6
Bengal and Orissa . . .	-2.0	+1.4	+0.7	-0.5	+1.8	-0.3	0	+1.0	+0.7	-0.2	-2.3	-0.2	0
Gangetic Plain and Chota Nagpur.	-2.8	+1.1	+1.3	-0.6	+2.7	-0.8	-0.9	+0.8	-0.1	-1.3	-0.5	+0.9	0
Upper Sub-Himalayas . . .	-4.3	+2.2	+2.2	0	+6.3	-0.4	+0.7	+2.5	+1.3	-0.7	+4.2	+3.1	+1.4
Indus Valley and North-West Rajputana.	-5.5	+2.1	+2.0	+0.6	+4.5	+1.1	+1.8	+1.1	+0.1	-1.9	+3.7	+4.4	+1.2
East Rajputana, Central India and Gujarat.	-4.8	+1.6	+1.6	+1.3	+2.4	-0.6	+0.6	+3.0	+2.1	+2.5	+4.4	+5.2	+1.6
Deccan	-3.4	+1.1	+0.4	+0.3	+1.5	+1.0	+1.0	+1.4	+1.3	+0.6	+0.6	+2.5	+0.7
West Coast	-1.6	+0.6	+0.4	-1.0	+0.1	0	+1.5	+0.9	+0.7	+1.5	-0.6	-1.6	+0.1
South India	-0.1	+1.2	-1.1	-0.7	-0.1	+0.7	+1.7	+1.5	+0.3	+1.1	-1.9	-2.2	0

TABLE III(c).—Variations of the mean monthly temperature from the normal in 1899 in the eleven meteorological provinces of India.

METEOROLOGICAL PROVINCE.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	YEAR.
	°	°	°	°	°	°	°	°	°	°	°	°	°
Burma Coast and Bay Islands .	+0.1	-0.4	+1.1	+0.7	-1.3	+0.3	+1.0	+1.2	+1.4	+1.7	-0.6	-0.6	+0.4
Burma Inland	-0.1	-0.5	+0.8	+1.5	-1.3	-0.7	-0.3	+0.8	+0.4	+0.6	-1.2	-2.0	-0.2
Assam	-2.7	+0.1	-0.1	-1.2	+1.9	-1.7	-1.5	-0.2	-0.8	-0.9	-1.2	-2.3	-0.9
Bengal and Orissa . .	-2.5	+0.9	+1.3	-1.0	+1.3	-0.9	-0.2	+1.2	+1.2	-0.4	-1.2	0	0
Gangetic Plain and Chota Nagpur.	-3.2	+1.5	+2.1	-1.7	+1.0	-1.1	-2.0	+1.3	+1.2	+0.8	+1.2	+1.8	+0.2
Upper Sub-Himalayas . .	-3.3	+2.3	+3.0	-0.7	+4.4	-1.0	+0.1	+3.9	+3.8	+1.2	+3.6	+3.4	+1.7
Indus Valley and North-West Rajputana.	-3.0	+2.6	+2.1	+1.1	+4.0	+1.2	+1.7	+2.0	+1.3	-0.4	+3.1	+4.2	+1.7
East Rajputana, Central India and Gujarat.	-3.5	+2.3	+2.3	+0.2	+1.0	-1.3	+0.5	+5.4	+4.3	+4.5	+5.0	+5.4	+2.2
Deccan	-2.1	+1.1	+1.4	-1.5	+0.3	+0.7	+1.5	+3.0	+3.6	+4.1	+3.9	+4.1	+1.7
West Coast	-1.3	+0.2	+0.4	-1.1	+0.1	+0.2	+1.8	+1.5	+0.5	+1.4	0	-0.2	+0.3
South India	-0.2	+0.6	-0.4	-2.1	-0.4	+1.0	+3.1	+2.5	+0.4	+1.1	+0.4	0	+0.5

TABLE IV.—Variations of the mean monthly and annual temperatures from the normal in 1899, in 54 of the 57 meteorological districts or divisions of India.

PROVINCE.	DIVISION.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	YEAR.
		°	°	°	°	°	°	°	°	°	°	°	°	°
BURMA	1. Tenasserim	+0.4	-1.3	+0.7	-0.1	-0.3	+0.8	+1.6	+1.1	+1.6	+2.0	-0.5	+1.3	+0.6
	2. Lower Burma	+0.4	-0.1	+1.3	+0.8	-2.1	-0.1	+0.8	+0.9	+1.2	+1.3	-1.0	-1.5	+0.2
	3. Central do.	+0.4	+0.4	+1.3	+3.2	-1.9	+0.3	+0.3	+1.6	+1.4	+2.3	?	-3.6	+0.5
	4. Upper do.	-0.1	-0.6	+0.7	+1.5	-1.0	-1.0	-0.4	+0.7	+0.3	+0.2	-1.2	-1.7	-0.2
	5. Arakan	-1.4	+0.6	+1.3	0	-0.8	+0.5	?	?	?	?	?	?	?
BENGAL AND ASSAM	6. Eastern Bengal . . .	-2.7	+0.1	+1.1	-0.7	+0.7	-0.9	-0.3	+1.0	+0.8	-0.5	-1.9	-0.4	-0.3
	7. Assam (Surma) . . .	-2.5	+0.5	+0.8	-0.5	+2.7	-1.0	?	+1.0	+0.1	-0.6	-1.1	-2.3	-0.3
	9. Do. (Brahmaputra) .	-2.8	-0.2	-0.6	-1.6	+1.6	-2.1	-1.6	-0.8	-1.3	-1.1	-1.2	-2.4	-1.2
	10. Deltaic Bengal . . .	-3.2	+0.4	+1.5	-0.3	+1.1	-1.0	-0.2	+1.5	+1.7	-0.7	-1.6	+0.2	-0.1
	11. Central do.	-3.0	+0.8	+1.3	-1.5	+1.9	-0.5	-0.5	+0.9	+1.2	-0.6	-0.9	-0.2	-0.1
	12. North do.	-2.9	+2.0	+0.8	-1.0	+3.2	-0.5	0	+0.5	+0.2	-0.1	-0.8	-0.8	+0.1
	13. Bengal Hills . . .	-2.1	?	-0.1	-0.1	+2.7	+0.6	-0.3	+0.8	+0.5	+0.2	-1.5	-0.9	0
	14. Orissa	-1.2	+1.1	+1.7	-1.6	-0.1	-1.4	+0.1	+2.0	+1.9	0	-0.8	+1.0	+0.2
	15. Chota Nagpur . . .	-2.6	+1.5	+3.0	-2.1	+0.6	+0.3	-0.4	+2.0	+2.1	+1.0	+1.6	+2.6	+0.8
	16. South Bihar	-3.4	+1.1	+1.5	-1.6	+1.1	-0.7	-2.8	+0.6	+0.9	+0.8	+1.0	+1.4	0
	17. North do.	-3.1	+1.3	+1.0	-1.8	+2.1	-0.3	-1.0	+0.6	+0.7	+0.4	-0.7	-0.4	-0.1

TABLE IV.—Variations of the mean monthly and annual temperatures from the normal in 1899 in 54 of the 57 meteorological districts or divisions of India—concl'd.

PROVINCE.	DIVISION.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	YEAR.
N.-W. PROVINCES AND OUDH.	18. North-Western Provinces East.	0	0	0	0	0	0	0	0	0	0	0	0	0
	19. South Oudh . . .	-3.7	+1.6	+1.7	-1.4	+1.1	-3.2	-3.0	+1.1	+0.9	+0.3	+1.8	+2.4	0
	21. North-Western Provinces, Central.	-3.3	+2.0	+2.8	-0.8	+2.2	-2.3	-2.2	+1.4	+0.9	+0.7	+2.5	+3.0	+0.6
	22. Do. do. West		+3.0	+4.6	-0.3	+2.4	-2.3	-2.7	+4.8	+3.9	+3.6	+7.6	+5.8	+2.5
	23. Do. do. East Submontane.	-3.0	+2.8	+2.9	-0.9	+3.4	-3.2	-2.2	+5.3	+4.7	+2.7	+4.1	+3.9	+1.7
	24. Do. do. West do.	-3.4	+1.0	+2.0	-2.8	+0.2	-2.1	-2.8	-0.4	+0.8	+0.5	+0.2	+0.1	-0.6
	25. Do. do. Hills . .	-3.5	+2.2	+2.6	-1.5	+2.0	-2.0	-1.5	+1.8	+1.6	+1.3	+2.2	+2.3	+0.6
PUNJAB . . .	26. South-East Punjab .	-3.3	+2.0	+3.5	-3.6	+2.6	+0.1	-0.2	+0.8	+1.4	+1.6	+1.3	+0.9	+0.6
	27. South do. . . .	-3.8	+1.8	+3.0	-2.4	+1.9?	-3.6	-1.7	+6.3	+5.2	+1.3	?	+3.1	+1.0
	28. Central do. . . .			+2.7	-0.6	+4.0	-1.1	+3.0	+6.3	+4.9	-0.2	+4.1	+3.9	+2.7
	29. Punjab Submontane .	-2.7			-0.4	+6.3		+3.0	+5.1	+5.0	+1.0	+5.4	+5.1	+3.1
	30. Do. Hills	-4.1	+2.9	+3.4	-0.2	+5.2	-0.2	+0.8	+4.6	+5.2	+1.1	+3.4	+3.3	+2.1
	31. North Punjab . . .	-3.2	-0.8	+1.5	-2.8	+3.0	-0.1	-0.6	-0.4	-0.4	+0.3	+0.4	-0.5	-0.3
	32. West do.	-2.3	+2.0	+2.7	+0.5	+6.2	+2.0	+1.8	+2.0	+3.1	+0.9	+4.0	+4.1	+2.3
BOMBAY AND MALABAR COAST DISTRICTS (MADRAS).	33. Malabar	-3.4	+2.5	+2.7	+1.4	+6.2	+1.2	+2.5	+1.8	+1.0	-0.9	+2.6	+3.9	+1.8
	34. Madras South-Central	-0.4	+0.1	-0.1	-1.9	-0.2	+0.3	+1.9	+1.4	+0.3	+1.3	+0.4	-0.9	+0.2
	35. Coorg	-0.6	+0.4	-0.9	-3.7	-0.2	+1.2	+2.8	+3.1	+0.8	+1.3	+0.3	-0.6	+0.3
	36. Mysore	+0.5	+0.4	+0.7	-1.6	-1.0	+0.1	+1.3	+0.4	-0.1	+2.0	+0.4	+0.6	+0.3
	37. Konkan	0	+0.9	+0.3	-2.4	-1.8	+0.3	+2.7	+2.3	+0.3	+1.5	-0.5	-0.3	+0.3
	38. Bombay Deccan . .	-2.1	+0.3	+0.7	-0.2	+0.3	0	+1.7	+1.6	+0.8	+1.6	-0.5	+0.6	+0.4
	40. Khandesh	-1.8	-0.1	+0.6	-3.0	-0.7	+0.2	+1.5	+2.3	+2.1	+4.2	+2.4	+2.1	+0.8
CENTRAL PROVINCES AND BERAR.	41. Berar	-3.8	+0.3	+1.0	-0.8	-0.2	-0.8	+2.2	+3.6	+4.6	+7.3	+5.8	+5.0	+2.0
	42. Central Provinces West	-2.4	+1.4	+1.6	-1.3	+0.3	+1.2	+2.5	+4.3	+6.0	+6.4	+5.2	+6.1	+2.6
	43. Do. Central	-3.0	+1.4	+1.6	-0.9	+0.2	+1.1	+1.2	+3.8	+5.5	+4.7	+4.8	+5.4	+2.2
	44. Do. East	-2.7	+1.7	+1.7	-1.0	+0.6	+0.9	+0.3	+2.9	+2.8	+3.4	+4.6	+4.5	+1.6
BOMBAY (NORTH).	45. Gujarat	-1.1	+0.9	+2.0	-2.3	+0.6	+0.5	+1.6	+1.6	+3.2	+1.1	+1.7	+4.4	+1.2
	46. Kathiawar and Cutch.	-2.1	+1.7		-0.2	-0.1	-1.5	+1.4	+2.7	+2.3	+5.6	+5.2	+5.9	+1.9
	47. Sird	-4.4	+1.2	+0.2	+0.6	-0.9	-0.2	+1.8	+2.7	+0.9	+2.6	+3.4	+5.7	+1.1
	48. Baluchistan Hills .	-3.1	+2.4	+1.1	+1.4	+1.9	+0.9	+0.4	+1.1	+0.4	-0.3	+3.2	+4.7	+1.2
RAJPUTANA AND CENTRAL INDIA.	49. Central India East .	-2.5	+3.2	+2.6	-0.4	+2.2	-0.3	-1.5	-0.7	-1.8	-0.8	+4.3	+4.3	+0.7
	50. Rajputana East, Central India West.	-4.0	+1.7	+1.9	-0.1	+0.7	-1.7	-0.9	+4.3	+3.8	+4.4	+4.8	+4.7	+1.6
	51. West Rajputana . .	-3.1	+2.9	+3.1	+1.0	+2.4	-0.3	+2.1	+7.5	+5.6	+4.8	+5.3	+5.5	+3.1
MADRAS	52. East Coast North . .	-2.5	+4.0	+3.3	+0.5	+4.8	+2.4	+3.5	+6.1	+4.3	+0.5	?	+4.3	+2.8
	53. Hyderabad South . .	-0.2	+0.6	-0.7	-0.6	-0.3	0	+5.1	+2.2	+2.7	+1.2	-0.6	0	+0.8
	54. Madras Central . . .	+0.4	+1.2	+1.0	-2.2	-0.1	+2.2	+4.4	+2.7	+3.0	+4.3	+3.5	+2.7	+1.9
	55. East Coast Central .	+0.1	+1.3	-0.3	-2.7	-0.9	+1.4	+3.2	+2.7	+0.5	+2.6	+1.4	+0.9	+0.9
	56. East Coast South . .	-0.6	+0.4	-0.5	-0.1	+1.1	+1.4	+4.9	+1.6	+0.3	+0.8	0	-0.3	+0.8
	57. Madras South	+0.2	+0.4	-0.3	-1.5	-0.1	+1.8	+2.9	+2.5	+0.9	-0.2	+0.1	-0.4	+0.5
		-1.3	-0.6	-1.1	-4.2	-0.6	-0.4	+0.8	+1.5	+0.1	+0.5	+0.3	-0.2	-0.4

In the discussion of the meteorology of India during the year 1899, the year is divided into four seasons according to the following arrangement :—

- 1st.—The cold weather period, including the months of January and February.
- 2nd.—The hot weather period, including the months of March, April and May.
- 3rd.—The period of the south-west monsoon rains proper, including the months of June, July, August and September.
- 4th.—The period of the retreating south-west monsoon, including the months of October, November and December.

The following give a resum of the chief features of the temperature conditions during the year :—

1.—The cold weather period.—A cold weather storm of moderate intensity in the last week of December 1898 gave moderate to heavy snow in the Upper India hills. This was followed by a well marked cool wave in the beginning of January when temperature was largely below the normal over the whole of Northern and Central India. January was unusually free from cold weather storms, and the air was abnormally dry and skies free from cloud. Two feeble disturbances affected Central India, North-Eastern India and the North Deccan during the first fortnight of the month and gave some local rain. Temperature was remarkably low during this period over the whole of Northern and Central India and the North Deccan. Two feeble low pressure waves passed from the Persian area across Northern India. They gave some cloud but no rain in the plains. Each was followed by a cool wave of moderate intensity and hence temperature was largely below the normal during the third and fourth weeks of the month. The most remarkable feature of this period was the remarkably low night temperature in South-West Bengal.

Temperature increased rapidly on the 25th and following days and was at the end of January in considerable excess in North-Western India and in slight to moderate defect in North-Eastern India, the deficiency being most marked in Bengal.

February was more disturbed than usual. A series of five depressions of the cold weather type advanced in succession across Northern India. The disturbances were, however, very feeble and gave little rain in the plains and only light snow in the hills and hence affected temperature very slightly. Temperature hence increased more rapidly than usual during the month and was in steady excess during the greater part of the month. An important feature of the month was increased dryness of the air, and hence greater radiation by night. The day temperature was much more largely in excess than the night temperature.

The snowfall of the period was much less than usual in Baluchistan, Afghanistan and the Western Himalayas. The rainfall in the plains of Northern and Central India was scanty in North-Western India, but was slightly above the normal of the period in the districts which received thunder showers from the two abnormal disturbances in Central India during the first fortnight of January.

The temperature conditions of the period were directly related to the chief abnormal features of the period which were.—

(1) Fewer cold weather storms than usual, more especially in January. The storms were also of feebler intensity than usual.

(2) The warm and cool waves accompanying the storms were feeble and exercised little influence on the mean temperature conditions of the period.

The following gives a summary of the chief features of these conditions :—

(1) The mean maximum or day temperature was generally in defect in January and in excess in February. The deficiency was considerable in January in North-Eastern India and it ranged between 3° and 5° in Central and North Bengal and Bihar. The excess in February was small in amount over the whole area except Baluchistan, the South Punjab, Sind, Rajputana, Cutch and the western half of the North-Western Provinces and of Central India where it ranged on the mean of the month between 3°, and 5°. The following gives comparative data for the various provinces :—

AREA.	VARIATION OF MEAN MAXIMUM TEMPERATURE FROM NORMAL IN		
	January.	February.	Cold weather period, January and February.
	0	0	0
Burma	+0.4	—1.2	—0.4
Assam	—2.3	+0.7	—0.8
Bengal	—3.3	0	—1.6
Orissa	—1.3	+0.9	—0.2
Bihar	—4.0	+0.9	—1.5
Chota Nagpur	—2.8	+2.1	—0.3
North Western Provinces and Oudh	—2.9	+2.7	—0.1
Punjab	—1.4	+1.9	+0.2
Baluchistan (Quetta)	+1.3	+4.3	+2.8
Sind	—0.4	+3.6	+1.6
Rajputana	—1.1	+4.1	+1.5
Gujarat	—2.6	+1.9	—0.3

AREA.	VARIATION OF MEAN MAXIMUM TEMPERATURE FROM NORMAL IN		
	January.	February.	Cold weather period, January and February.
	°	°	°
Central India	-3'2	+2'0	-0'6
Central Provinces	-1'1	+1'3	+0'1
Berar	-0'1	+0'9	+0'4
West Coast	-0'9	-0'2	-0'5
Bombay Deccan	-0'5	+0'1	-0'2
Mysore	+0'6	+0'5	+0'5
Madras Coast	+0'2	-0'2	0
Madras Deccan	+0'7	+0'7	+0'7
South India	-1'6	-0'7	-1'1

The variations of the maximum temperature of the period were generally small in amount in consequence of the opposite variation in the two months. The only important variations were an excess of nearly 3° in Baluchistan and of 1½° in Sind and Rajputana and a deficiency of 1½° in Bengal and Bihar.

(2) The mean minimum or night temperature was in general defect in January and in general excess in February. The mean variations of the period were small to moderate in amount. The variations were most pronounced in Upper India where the night temperature was in considerable to large defect in January and in moderate to considerable excess in February. They averaged 2° in amount in five areas or divisions, *vis.*, Assam, the Bombay Deccan, Sind, Gujarat and Baluchistan. The following gives comparative data for the various provinces:—

AREA.	VARIATION OF MEAN MINIMUM TEMPERATURE FROM NORMAL IN		
	January.	February.	Cold weather period, January and February.
	°	°	°
Burma	-0'4	+0'5	0
Assam	-3'0	-0'6	-1'8
Bengal	-2'2	+1'3	-0'4
Orissa	-1'0	+1'2	+0'1
Bihar	-2'5	+1'5	-0'5
Chota Nagpur	-2'3	+0'9	-0'7
North-Western Provinces and Oudh	-3'9	+1'7	-1'1
Punjab	-4'9	+2'8	-1'0
Baluchistan (Quetta)	-6'3	+2'1	-2'1

AREA.	VARIATION OF MEAN MINIMUM TEMPERATURE FROM NORMAL IN		
	January.	February.	Cold weather period, January and February.
	°	°	°
Sind	-5'8	+1'1	-2'3
Rajputana	-4'8	+2'0	-1'4
Gujarat	-4'6	+0'8	-1'9
Central India	-4'7	+1'4	-1'6
Central Provinces	-3'7	+1'5	-1'1
Berar	-4'0	+1'8	-1'1
West Coast	-1'6	+0'6	-0'5
Bombay Deccan	-4'1	0	-2'0
Mysore	-0'6	+1'3	+0'3
Madras Coast	0	+1'2	+0'6
Madras Deccan	-0'6	+1'8	+0'6
South India	+0'1	+0'8	+0'4

(3) The mean temperature in January was below the normal over the whole area, except Central and Lower Burma and above it in February, except in parts of Burma. It hence varied slightly on the mean of the period from the normal and was in slight defect generally in Northern and Central India and normal or in slight excess in Burma and the Peninsula. The variations were less than 1° except in Assam, Bengal, Bihar, Gujarat, Central India and the Bombay Deccan, where the mean temperature of the period ranged between 1° and 1'3° in defect. The following gives comparative data for the various provinces:—

AREA.	VARIATION OF MEAN DAILY TEMPERATURE FROM NORMAL IN		
	January.	February.	Cold weather period, January and February.
	°	°	°
Burma	0	-0'4	-0'2
Assam	-2'7	+0'1	-1'3
Bengal	-2'8	+0'7	-1'0
Orissa	-1'2	+1'1	0
Bihar	-3'3	+1'2	-1'0
Chota Nagpur	-2'6	+1'5	-0'5
North-Western Provinces and Oudh	-3'4	+2'2	-0'6

AREA.	VARIATION OF MEAN DAILY TEMPERATURE FROM NORMAL IN		
	January.	February.	Cold weather period, January and February.
Punjab	•	•	•
Baluchistan (Quetta)	-3'2	+2'4	-0'4
Sind	-2'5	+3'2	+0'3
Rajputana	-3'1	+2'4	-0'3
Gujarat	-3'0	+3'1	•
Central India	-3'6	+1'4	-1'1
Central Provinces	-4'0	+1'7	-1'1
Berar	-2'4	+1'4	-0'5
Berar	-2'1	+1'4	-0'3
West Coast	-1'3	+0'2	-0'5
Bombay Deccan	-2'3	•	-1'1
Mysore	•	+0'9	+0'4
Madras Coast	+0'1	+0'5	+0'3
Madras Deccan	+0'1	+1'3	+0'7
South India	-0'8	+0'1	-0'3

The following gives a brief statement of the cool waves of the period :—

(1) *Cool wave of the 1st to the 7th of January.*—This cool wave followed the cold weather storm of the last week of December which gave heavy snow in the Upper India mountain districts. The reduction of temperature was greatest in Baluchistan and Upper India on the 1st and 3rd. The cool wave advanced into the Central Provinces on the 4th, Bihar and Bengal on the 5th and 6th, its effect diminishing rapidly in its eastward extension.

The following gives variation data on each day from the 3rd to the 7th illustrating the progress of the warm and cold waves of this period :—

STATION.	VARIATION FROM NORMAL OF MEAN TEMPERATURE PRECEDING 8 A.M. OF DATE.				Total range of variation during period.
	Greatest excess.	Date.	Greatest defect.	Date.	
Quetta	+ 6'2	28th December 1898.	-15'1	3rd January 1899	21'3
Hyderabad	+ 10'2	29th December 1898.	-11'9	3rd „ „	22'1
Ajmer	+ 8'9	30th December 1898.	- 8'2	7th „ „	17'1
Allahabad	+ 8'1	31st December 1898.	- 7'7	5th „ „	15'8
Saugor Island	+ 9'6	1st January 1899.	- 8'1	10th „ „	17'7

A feature of this cold wave was the great reduction of temperature at the hill stations accompanying the low

elevation of the snow line. The following gives the greatest reduction below the normal at five stations :—

STATION.	DATE.	VARIATION FROM NORMAL OF		
		Maximum temperature.	Minimum temperature.	Mean temperature.
Srinagar	6th January	- 8'0	- 4'6	- 6'3
Murree	7th „	-16'0	-12'5	-14'3
Simla	7th „	-21'0	-15'8	-18'4
Ranikhet	8th „	-18'9	-14'3	-16'6
Chakrata	7th „	-19'8	-16'3	-18'1

(2) *Cool wave of the 14th to the 15th January.*—Temperature continued much lower than usual over Northern and Central India during the interval between the 8th to the 13th, due chiefly to the remarkable dryness of the air favouring terrestrial radiation. A feeble disturbance which originated in Persia on the 10th and 11th passed through Baluchistan into Upper India on the 12th and 13th. The warm wave in front was unusually feeble, and increased temperature temporarily from 2° to 4°. The cool wave in its rear was more marked reducing temperature from 15° to 6°. The following variation data for the period 15th to the 18th, show the progress of the cool wave across Northern India :—

PROVINCE OR AREA.	VARIATION FROM NORMAL OF MEAN TEMPERATURE OF 24 HOURS PRECEDING 8 A.M. OF			
	15th January.	16th January.	17th January.	18th January.
Baluchistan (Quetta)	-15'5	-1'1	-3'3	-5'3
Punjab	- 5'3	-6'6	-7'6	-5'1
Sind	- 6'4	-6'3	-7'2	-5'5
Rajputana	- 2'5	-4'6	-6'3	-5'8
North-Western Provinces and Oudh.	- 0'6	-3'9	-7'2	-7'5
Central India	- 1'6	-3'9	-7'8	-7'1
Bihar	- 1'1	-1'7	-5'8	-6'6
Chota Nagpur	- 1'7	-1'8	-4'9	-6'1
Bengal	- 2'9	-2'6	-5'4	-6'6

The preceding data show that the wave of greatest reduction of temperature below the normal was in Baluchistan on the 14th and 15th, in the South Punjab on the 16th, in the South Punjab, Rajputana, Bundelkhand

and Baghelkhand on the 17th, and in the eastern districts of the North-Western Provinces and Bengal on the 18th.

The reduction of temperature during the progress of the cool wave was very strongly marked in the night temperature and the lowest minimum temperatures of the month were generally reported during this period in the plains of Northern India. The following gives some of the more noteworthy minimum temperatures registered during this period, their variations from the normal and the lowest hitherto recorded at eight typical stations in January:—

STATION.	Lowest minimum temperature recorded in January.	Variation of actual from normal, January.	Date on which recorded.	Lowest minimum temperature recorded in January previous to 1899.	Year in which recorded.
Peshin . . .	8°4	?	15th	9°0	1895
Quetta . . .	10°8	—18°7	15th	9°3	1897
Peshawar . .	28°9	—10°7	18th	28°8	1878 and 1880.
Ajmer . . .	33°5	—13°6	18th	31°0	1867
Sutna . . .	36°1	—12°4	17th	34°2	1878
Allahabad . .	36°4	—12°0	18th	36°0	1878
Patna . . .	41°2	—9°2	18th	36°4	1878
Calcutta . . .	44°2	—11°3	20th	45°5	1878

The lowest night temperatures of the year were generally recorded in Northern India during the advance of this cool wave. They were not so low as have been previously recorded in the Punjab, Rajputana, Central India and the North-Western Provinces, but were lower at many stations in Bengal. The following gives examples of the abnormally low minimum temperature in that area:—

STATION.	Lowest minimum temperature recorded in January.	Variation of actual from normal, January.	Date on which recorded.	Lowest minimum temperature recorded in January previous to 1899.	Year in which recorded.
Saugor Island .	46°0	—13°5	22nd January.	46°8	1878
Calcutta . . .	44°2	—11°3	20th January.	45°5	1878
Mymensingh . .	39°7	—12°9	17th January.	41°1	1887
Jessore . . .	42°1	—11°0	18th January.	41°5	1882
Berhampore . .	43°1	—9°9	18th January.	41°0	1874

The night temperature was also remarkably low in Berar, the Central Provinces, Rajputana, Central India and Khandesh during the period from the 9th to the 18th. The following gives the lowest minimum temperatures recorded in that area and also the lowest at the same stations in previous years for comparison:—

STATION.	Lowest minimum temperature recorded in January.	Variation of actual from normal, January.	Date on which recorded.	Lowest minimum temperature recorded in January previous to 1899.	Year in which recorded.
Khandwa . . .	36°2	—15°9	9th January.	35°7	1878
Jubbulpore . .	34°9	—12°6	9th "	34°4	1890 and 1898.
Malegaon . . .	37°2	—15°3	9th "	36°6	1883
Hoshangabad . .	40°2	—12°7	11th "	40°0	1875
Hyderabad (Sind).	37°0	—13°7	3rd "	37°5	1897
Nowgong . . .	35°5	—12°4	17th & 18th	34°0	1878
Jaipur . . .	36°2	—10°4	9th "	35°0	1888
Ajmer . . .	33°5	—13°6	18th "	31°0	1867
Akola . . .	39°7	—13°7	9th "	39°2	1880
Sambhar . . .	33°0	—11°8	9th "	34°0	1897

(3. *Warm and cool waves of the 21st to the 28th February.*—Several cold weather depressions and disturbances affected North-Western India during the month. They were unusually feeble and the precipitation accompanying them was generally small in amount. They hence exercised little influence on the temperature which was above the normal during nearly the whole of the month, with one exception, *viz.*, the period of the depression which originated in Persia and passed across Northern India between the 23rd and 27th.

The advance of the waves is indicated by the following data:—

DATE.	WARM WAVE.		COOL WAVE.	
	Station.	Variation from normal of mean temperature of 24 hours preceding 8 A.M. of date.	Station.	Variation from normal of mean temperature of 24 hours preceding 8 A.M. of date.
21st February .	Baghdad .	+ 6°2		
" " .	Teheran .	+ 12°0		
22nd " .	Bushire .	+ 8°2	Baghdad .	—4°9
" " .	Teheran .	+ 6°2		
" " .	Ispahan .	+ 6°5		
23rd " .	Jask .	+ 5°4	Baghdad .	—8°7
" " .	Quetta .	+ 14°5	Bushire .	—1°7
" " .	Hyderabad .	+ 7°1	Teheran .	—7°0

DATE.	WARM WAVE.		COOL WAVE.	
	Station.	Variation from normal of mean temperature of 24 hours preceding 8 A.M. of date.	Station.	Variation from normal of mean temperature of 24 hours preceding 8 A.M. of date.
24th February	Sambhar	+11'6	Bushire	-7'7
" "	Bikaner	+11'1	Teheran	-2'9
" "	"	"	Ispahan	-3'0
25th "	Jhansi	+7'2	Quetta	-6'1
" "	Sambhar	+6'2		
26th "	Balasore	+8'9	Quetta	-4'1
" "	Burdwan	+7'3	Kurrachee	-3'9
27th "	Chaibassa	+6'5	Hyderabad (Sind)	-5'9
" "	Balasore	+5'6		
28th "	Calcutta	+3'3	Neemuch	-6'7
" "	Akyab	+3'0	Malegaon	-6'1

The increase of temperature accompanying the advance of the warm wave in front of the storm was greatest on the 20th and 21st in Asiatic Turkey and Persia, on the 23rd in Baluchistan, on the 24th in Rajputana, on the 25th in Central India, on the 26th and 27th in North-Eastern India and on the 28th in Burma. The reduction of temperature accompanying the advance of the cool wave was greatest in Asiatic Turkey on the 22nd and 23rd, in Persia on the 24th, in Baluchistan on the 25th and 26th, in Sind on the 27th and in Central India on the 28th. The total variation of the mean temperature due to these two waves was 21'1° at Quetta and was nearly as large as in Persia.

II. The hot weather period.—The weather was more disturbed than usual in the first three weeks of March. Four depressions, of which two advanced from Persia and one from Baluchistan affected the weather in North-Western India. They were, however, similar in character to the February depressions, giving little precipitation, except in Baluchistan and the hills. The rainfall was more favourable in Baluchistan than it had hitherto been. The last of the series of depressions was followed by a cool wave of moderate intensity. The chief feature of the month was the abnormal dryness of the air over nearly the whole of the interior of Northern and Central India. Strong local sea winds set in on the Bengal Coast on the 24th and 25th and increased very considerably on the 27th, 28th and 29th. These winds gave series of thunderstorms of unusual intensity and much rain in Cachar, Sylhet and the Assam hills. The most important feature of the temperature of the month was the excessive

temperature which prevailed in North-Western India from the 23rd to the 28th or 29th. The mean temperature was from 10° to 13° above the normal at several stations. The following table gives the variations of temperature from the normal for the two stations at which the excess was greatest on each day of the period from the 22nd to the 28th:—

DATE.	STATION.	VARIATION FROM NORMAL OF		
		Maximum temperature.	Minimum temperature.	Mean temperature.
		°	°	°
22nd March	Quetta	+10'5	+4'3	+7'4
23rd "	Quetta	+10'9	+5'9	+8'4
" "	Jacobabad	+8'8	+7'7	+8'3
24th "	Montgomery	+14'4	+6'8?	+10'6?
" "	Bikaner	+8'7	+10'2	+9'5
25th "	Lahore	+9'1	+15'1	+12'1
" "	Rawalpindi	+12'3	+11'6	+12'0
26th "	Jaipur	+12'7	+11'4	+12'1
" "	Bikaner	+10'8	+10'6	+10'7
27th "	Lahore	+7'7	+13'7	+10'7
" "	Sialkot	+8'0	+9'7	+8'9
28th "	Rawalpindi	+10'9	+12'8	+11'9
" "	Sialkot	+10'9	+10'2	+10'6

April was more disturbed than usual over the whole of India. A succession of depressions formed in Sind and passed eastwards across Upper India. Each depression during its advance gave series of duststorms in the plains and thunderstorms in the lower ranges and snowstorms in the higher ranges of the Kashmir and Punjab Himalayas.

The most abnormal feature of the month was an unusually prolonged and excessive burst of rain (accompanying thunderstorms) between the 10th and 24th in the Peninsula and North-Eastern India. The rainfall of the month was hence in excess over the greater part of India and the excess was abnormally large in the southern half of the Peninsula.

The weather from the 1st to the 9th was unusually hot and dry, and in fact the conditions were similar to those which prevailed in March.

Bengal and Assam received daily rain from the 9th to the 15th. This rainfall, as is usual in the hot weather, reduced temperature very largely below the normal. The

following gives temperature variation data of North-Eastern India for the period from the 10th to the 18th :—

DIVISION OR AREA.	VARIATION FROM NORMAL OF MEAN TEMPERATURE OF 24 HOURS PRECEDING 8 A.M. OF								
	10th April.	11th April.	12th April.	13th April.	14th April.	15th April.	16th April.	17th April.	18th April.
	0	0	0	0	0	0	0	0	0
Assam . . .	-5.6	-9.5	-7.9	-7.0	-2.2	-4.1	-1.8	-1.3	-0.7
Bengal, North .	-4.7	-9.1	-9.0	-9.5	-6.0	-10.8	-5.5	-1.7	-1.5
Bengal, East .	-4.7	-8.9	-5.7	-6.7	-4.4	-2.7	-1.0	+0.6	-0.5
Bengal, Deltaic .	-4.0	-7.6	-5.5	-4.0	-5.8	-5.2	-2.1	+0.4	+1.4
Bengal, Central.	-4.8	-12.2	-10.7	-7.5	-7.4	-10.0	-5.2	-1.4	-1.6
Bihar . . .	-2.7	-13.5	-9.2	-5.5	-8.6	-9.5	-6.0	-1.9	-1.8
Chota Nagpur .	-2.1	-12.1	-5.7	-4.0	-8.9	-10.6	-5.9	-3.5	-3.7
Orissa . . .	-5.3	-9.6	-5.1	-2.8	-6.9	-6.0	-4.8	-1.6	-1.1

The rainfall in the Peninsula commenced in Southern India on the 10th and extended northwards into the Deccan and Konkan on the 15th and to Berar and the Central Provinces on the 17th. The rainfall reduced temperature largely below the normal in the Peninsula, as is shown by the following comparative data :—

DIVISION OR AREA.	VARIATION FROM NORMAL OF MEAN TEMPERATURE OF 24 HOURS PRECEDING 8 A.M. OF								
	10th April.	11th April.	12th April.	13th April.	14th April.	15th April.	16th April.	17th April.	18th April.
	0	0	0	0	0	0	0	0	0
Central Provinces	+0.7	-2.5	-0.1	+0.6	-0.9	-2.1	+0.2	+0.1	+1.8
Berar . . .	+3.8	+2.2	+3.2	+2.9	+0.5	+1.1	-0.3	0	+0.8
West Coast .	-0.1	-1.0	-1.4	-1.0	-0.6	-1.7	-2.4	-0.7	-0.3
Bombay Deccan	-0.4	-0.9	-0.5	-0.4	-1.3	+0.3	-0.7	-1.9	-2.6
Mysore . . .	-0.4	+0.4	-2.2	-3.2	-1.7	-2.9	-6.4	-8.0	-3.6
Madras Coast .	+0.8	+1.4	-0.9	-0.9	-1.1	-2.5	-2.8	-4.2	-3.5
Madras Deccan	+0.6	-0.7	-1.6	-1.8	-1.5	-4.6	-6.9	-10.5	-8.1
South India .	-2.6	-4.4	-6.4	-6.8	-5.0	-5.5	-10.8	-9.6	-6.4

The reduction of temperature was, as is usual during periods of rainfall in the hot weather, chiefly exhibited in the day temperature.

A depression which formed in Sind on the 14th and 15th gave heavy precipitation in some parts of Baluchistan, Afghanistan and the Western Himalayas. This was followed by a large temporary reduction of temperature in North-Western India.

Showery weather continued in North-Eastern India and the Peninsula until the 24th. Berar received series of thundershowers on the 22nd and 23rd, which reduced temperature to a remarkable extent.

The following gives data in illustration :—

DATE.	STATION.	VARIATION FROM NORMAL OF		
		Maximum temperature.	Minimum temperature.	Mean temperature.
		0	0	0
22nd . . .	Amraoti . . .	-27.7	-8.4	-16.1
„ . . .	Akola . . .	-29.8	-9.0	-19.4
„ . . .	Buldana . . .	-23.1	-15.2	-19.2
„ . . .	Chikalda . . .	-12.1	-15.2	-13.7
23rd . . .	Amraoti . . .	-21.4	-9.1	-15.3
„ . . .	Akola . . .	-21.4	-8.1	-14.8
„ . . .	Buldana . . .	-19.2	-9.3	-14.3
„ . . .	Chikalda . . .	-16.3	-9.4	-12.9

The disturbed conditions passed away on the 24th and 25th and fine weather with rapidly increasing temperature prevailed during the remainder of the month.

May was less disturbed than usual and temperature was hence steadily in excess during the month in North-Western India. The advent of the monsoon was delayed in the southern half of the Peninsula and the rainfall of the month was hence considerably below the normal in that area. Temperature was hence steadily above the normal in the Peninsula. A small cyclonic storm advanced into Burma in the first week of the month and was followed by the prevalence of humid winds which gave excessive rain. Bengal and Assam also received frequent rain from local storms. Temperature was hence below the normal in these areas during the greater part of the month, this feature being very marked in Burma.

The following gives a summary of the more important temperature conditions of the period.

(1) Temperature was above the normal during the period in North-Western India and normal in Central India, as is shown by the following data :—

AREA.	VARIATION OF MEAN MAXIMUM TEMPERATURE FROM NORMAL IN			
	March.	April.	May.	Hot weather period, March to May.
	0	0	0	0
Baluchistan (Quetta) . . .	+2.5	+1.3	2.9	+2.2
Punjab	+2.8	-0.3	+3.3	+2.1
Sind	+1.4	+1.7	+1.4	+1.5
North-Western Provinces and Oudh.	+3.5	-1.9	+0.1	+0.6
Rajputana	+3.7	+0.4	+1.2	+1.3
Central India	+2.5	-1.7	-0.9	0

AREA.	VARIATION OF MEAN MINIMUM TEMPERATURE FROM NORMAL IN			
	March.	April.	May.	Hot weather period, March to May.
Baluchistan (Quetta)	0	0	0	0
Punjab	+2'7	-2'0	+1'5	+0'7
Sind	+2'9	+0'3	+6'7	+3'3
Sind	+0'8	+1'1	+2'3	+1'4
North-Western Provinces and Oudh.	+1'7	-0'5	+3'5	+1'6
Rajputana	+2'4	+1'3	+4'2	+2'6
Central India	+1'2	+1'6	+1'4	+1'4

AREA.	VARIATION OF MEAN TEMPERATURE FROM NORMAL IN			
	March.	April.	May.	Hot weather period, March to May.
Baluchistan (Quetta)	0	0	0	0
Punjab	+2'6	-0'4	+2'2	+1'5
Punjab	+2'9	0	+5'3	+2'7
Sind	+1'1	+1'4	+1'9	+1'5
North-Western Provinces and Oudh.	+2'6	-1'2	+1'8	+1'1
Rajputana	+3'1	+0'9	+2'7	+2'2
Central India	+1'9	-0'1	+0'3	+0'7

The preceding data show that the excess of temperature was most marked in May. It was slightly greater in amount in the night than in the day temperature.

The following gives data for the area in which the excess was greatest :—

STATION.	VARIATION FROM NORMAL OF MEAN TEMPERATURE IN			
	March.	April.	May.	Hot weather period, March to May.
Rawalpindi	0	0	0	0
Rawalpindi	+3'3	+1'0	+7'4	+3'9
Lahore	?	-0'4	+6'3	?
Montgomery	+3'3	?	?	?
Mooltan	+3'5	+1'9	+6'6	+4'0

(2) Temperature was slightly in excess on the mean of the period in North-Eastern India and Burma. It was above the normal in two months, *vis.*, March and May in North-Eastern India and in March and April in Burma. Rainfall reduced temperature considerably below the

normal in Bengal in April and in Burma in May. The following tables give data in illustration :—

AREA.	VARIATION OF MEAN MAXIMUM TEMPERATURE FROM NORMAL IN			
	March.	April.	May.	Hot weather period, March to May.
Bihar	0	0	0	0
Bihar	+1'0	-3'1	+0'3	-0'6
Chota Nagpur	+4'5	-3'3	-1'3	0
Orissa	+3'2	-2'2	-0'3	+0'3
Bengal	+1'5	-1'2	+1'2	+0'5
Assam	+0'4	-1'4	+1'8	+0'3
Lower Burma	+0'7	-0'1	-1'6	-0'3
Upper "	+1'2	+1'4	-2'4	+0'1

AREA.	VARIATION OF MEAN MINIMUM TEMPERATURE FROM NORMAL IN			
	March.	April.	May.	Hot weather period, March to May.
Bihar	0	0	0	0
Bihar	+1'4	-0'2	+2'8	+1'3
Chota Nagpur	+1'4	-0'8	+2'4	+1'0
Orissa	+0'2	-1'2	+0'3	-0'2
Bengal	+0'8	-0'3	+2'1	+0'9
Assam	-0'6	-0'9	+1'9	+0'1
Lower Burma	+1'8	+1'7	+1'0	+1'2
Upper "	+0'2	+1'6	+0'5	+0'8

AREA.	VARIATION OF MEAN TEMPERATURE FROM NORMAL IN			
	March.	April.	May.	Hot weather period, March to May.
Bihar	0	0	0	0
Bihar	+1'2	-1'7	+1'6	+0'4
Chota Nagpur	+3'0	-2'1	+0'6	+0'5
Orissa	+1'7	-1'7	0	0
Bengal	+1'2	-0'8	+1'7	+0'6
Assam	-0'1	-1'2	+1'9	+0'2
Lower Burma	+1'3	+0'8	-0'3	+0'6
Upper "	+0'7	+1'5	-1'0	+0'4

(3) The variations of the monthly mean temperature differed little from the normal in the Peninsula in March and May. There was a moderate to considerable deficiency

in April due to abnormal rain. The following tables give data showing the variation of the maximum, minimum and mean temperature from the normal :—

AREA.	VARIATION OF MAXIMUM TEMPERATURE FROM NORMAL IN			
	March.	April.	May.	Hot weather period, March to May.
Berar	+3'6	-3'3	-0'3	0
Central Provinces	+2'7	-3'1	-1'0	-0'5
Bombay Deccan	+1'6	-3'9	-1'2	-1'2
West Coast	+0'3	-1'1	0	-0'3
Madras Deccan	+1'0	-4'2	-1'1	-1'4
Madras Coast	+0'2	-0'7	+1'3	+0'3
South India	0	-6'3	-1'1	-2'5

AREA.	VARIATION OF MINIMUM TEMPERATURE FROM NORMAL IN			
	March.	April.	May.	Hot weather period, March to May.
Berar	+1'4	+0'8	+0'9	+1'0
Central Provinces	+0'8	+0'6	+2'0	+1'1
Bombay Deccan	-0'2	-1'0	+0'1	-0'4
West Coast	+0'4	-1'0	0	-0'2
Madras Deccan	-1'0	-0'9	-0'3	-0'7
Madras Coast	-0'9	-0'1	+0'2	-0'3
South India	-1'8	-1'2	+0'3	-0'9

AREA.	VARIATION OF MEAN TEMPERATURE FROM NORMAL IN			
	March.	April.	May.	Hot weather period, March to May.
Berar	+2'5	-1'3	+0'3	+0'5
Central Provinces	+1'8	-1'3	+0'5	+0'3
Bombay Deccan	+0'7	-2'5	-0'6	-0'8
West Coast	+0'4	-1'1	0	-0'2
Madras Deccan	0	-2'6	-0'7	-1'1
Madras Coast	-0'4	-0'4	+0'3	0
South India	-0'9	-3'8	-0'4	-1'7

The following gives a brief account of the hottest

periods of May and the first week of June preceding the advent of the monsoon rains.

The period 1st to the 9th May was characterized by a general excess of temperature over nearly the whole of Northern and Central India. The chief feature of this period was the great excess of temperature in Bengal and Bihar on the 4th, 5th, 6th, 7th and 8th. The following gives data in illustration :—

PROVINCE OR DIVISION.	VARIATION FROM NORMAL OF MEAN TEMPERATURE OF 24 HOURS PRECEDING 8 A.M. OF								
	1st May.	2nd May.	3rd May.	4th May.	5th May.	6th May.	7th May.	8th May.	9th May.
Assam	+4'7	+3'2	+5'3	+6'9	+6'5	+2'5	+4'6	+4'4	+3'3
Bengal	+3'8	+4'7	+5'2	+7'4	+8'2	+7'9	+8'5	+9'1	+8'4
Orissa	-2'3	+1'1	+1'4	+4'0	+4'9	+5'4	+5'1	+4'3	+4'9
Bihar	+2'8	+3'8	+4'2	+5'4	+8'4	+8'4	+8'8	+9'0	+8'4
Chota Nagpur	+0'1	+2'3	+1'9	+4'1	+5'8	+5'2	+6'7	+7'2	+7'2

During the next week temperature fell in Burma and North Eastern India due to rainfall, whilst it increased in Upper India, where it was in very large excess from the 10th to the 13th. The following gives variation data for the stations at which the excess was greatest during this period :—

DATE.	STATION.	VARIATION FROM NORMAL OF		
		Maximum temperature of 24 hours preceding 8 A.M. of date.	Minimum temperature of 24 hours preceding 8 A.M. of date.	Mean temperature of 24 hours preceding 8 A.M. of date.
10th May	Dera Ismail Khan	+12'6	+15'1	+13'9
	Sialkot	+10'0	+14'7	+12'4
	Rawalpindi	+15'5	+5'4	+10'5
	Mooltan	+9'7	+11'0	+10'4
11th „	Sialkot	+12'7	+14'9	+13'8
	Lahore	+11'1	+17'1	+14'1
	Ludhiana	+11'1	+13'1	+12'1
	Roorkee	+10'7	+15'8	+12'3
12th „	Sialkot	+12'1	+14'6	+13'4
	Lahore	+8'2	+16'3	+12'5
	Dera Ismail Khan	+12'2	+11'5	+11'9
	Montgomery	+5'7	+17'0	+11'4
13th „	Sirsa	+10'8	+15'8	+13'3
	Mooltan	+11'8	+11'8	+11'8
	Dera Ismail Khan	+9'7	+12'3	+11'0

The maximum temperatures of the month were generally recorded in the North-Western Provinces and South Punjab on the 11th.

The reduction of temperature below the normal due to thunder showers and dust storms which commenced in Bengal on the 11th extended over the whole of India except the Punjab, Sind, Rajputana and the West Coast during the next few days and was most marked on the 20th.

Temperature increased from the 21st over nearly the whole of India and more especially in North-Western India and was excessive in that area on the 27th and 28th, on which dates the highest day temperatures of the month were generally recorded in Sind and the Punjab. The following gives the most noteworthy :—

STATION.	Date.	Highest maximum temperature recorded in May.
		°
Jacobabad	27th May	122°0
Khushab	" "	118°9
Montgomery	" "	117°5
Dera Ismail Khan	" "	117°2
Peshawar	" "	115°0
Sialkot.	" "	114°4
Lahore	" "	114°6
Rawalpindi	" "	114°0
Rawalpindi	28th "	114°0
Patiala	" " "	108°8

A remarkable feature of the temperature conditions of the last week of the month was a large local fall in Baluchistan, due to conditions in the Persian area and independent of the changes in progress over India. The following table gives data in illustration :—

STATION.	VARIATION FROM NORMAL OF MEAN TEMPERATURE OF 24 HOURS PRECEDING 8 A.M. OF				
	27th May.	28th May.	29th May.	30th May.	31st May.
	°	°	°	°	°
Baghdad	+2°9	?	?	?	?
Bushire	-3°9	-4°1	-3°7	-5°1	-2°7
Quetta	+4°1	-2°8	-8°4	-7°8	-7°7

These remarkable conditions lasted until the 4th or 5th June, as is shown by the following data :—

STATION.	VARIATION FROM NORMAL OF MEAN TEMPERATURE OF 24 HOURS PRECEDING 8 A.M. OF					
	1st June.	2nd June.	3rd June.	4th June.	5th June.	6th June.
	°	°	°	°	°	°
Baghdad	+6°0	?	?	?	?	?
Bushire	-0°2	-1°1	-2°0	-2°6	-2°4	-0°4
Teheran	-9°7	-7°9	-4°7	+0°4	+2°7	+3°7
Quetta	-10°0	-10°7	-10°3	-5°4	-3°1	-2°5

The data hence indicate that the reduction in temperature was as marked in Persia as in Baluchistan, and was probably due to abnormal conditions in these areas or in the areas to the north-west.

The monsoon rains commenced on the 9th and 10th on the Konkan Coast and extended rapidly into the interior. Temperature was in general excess during the period from the 1st to the 10th. From the 1st to the 5th the excess was greatest in West Bengal and the Central Provinces. The following gives data for the stations at which the excess was greatest :—

DATE.	STATION.	VARIATION FROM NORMAL OF		
		Maximum temperature of 24 hours preceding 8 A.M. of date.	Minimum temperature of 24 hours preceding 8 A.M. of date.	Mean temperature of 24 hours preceding 8 A.M. of date.
		°	°	°
1st June .	Hazaribagh	+7°0	+7°5	+7°3
2nd „ .	Nagpur	+6°5	+10°3	+8°4
3rd „ .	Chanda	+9°0	+7°9	+8°5
4th „ .	Nagpur	+7°1	+10°7	+8°9
5th „ .	Chanda	+10°4	+11°2	+10°8

The excess, as usual in the hot weather period, was larger in the night than in the day temperature.

The area of greatest excess of temperature was gradually transferred northwards and westwards during the

next week, as shown by the following data for the stations at which the excess was greatest from the 6th to the 12th :—

DATE.	STATION.	VARIATION FROM NORMAL OF		
		Maximum temperature of 24 hours preceding S.A.M. of date.	Minimum temperature of 24 hours preceding S.A.M. of date.	Mean temperature of 24 hours preceding S.A.M. of date.
6th June .	Amraoti	+10°7	+ 9°5	+10°1
	Hoshangabad	+ 7°8	+11°8	+ 9°8
7th „ .	Nagpur	+ 9°9	+ 9°7	+ 9°8
	Seoni	+ 8°4	+10°6	+ 9°5
8th „ .	Nagpur	+ 8°6	+11°9	+10°3
	Ranchi	+10°9	+ 8°4	+ 9°7
9th „ .	Hazaribagh	+12°3	+ 7°8	+10°1
	Ranchi	+11°9	+ 7°7	+ 9°8
10th „ .	Ranchi	+11°7	+10°9	+11°3
	Sialkot	+ 9°6	+ 9°6	+ 9°6
11th „ .	Rawalpindi	+11°7	+ 8°6	+10°2
	Sialkot	+ 8°4	+ 8°9	+ 8°7
12th „ .	Rawalpindi	+ 9°7	+ 8°0	+ 8°9
	Dera Ismail Khan	+ 6°4	+ 9°5	+ 8°0

The extension of rainfall to Upper India was followed by a reduction of temperature ranging from 10° to 23°. The following data for seven stations illustrate this feature :—

STATION.	VARIATION FROM NORMAL OF MEAN TEMPERATURE OF 24 HOURS PRECEDING S.A.M. OF		Reduction of temperature from the 10th to 14th June.
	10th June.	14th June.	
Delhi	+7°3	—16°0	23°3
Ludhiana	+6°5	—11°3	17°8
Barielly	+7°9	—14°9	22°8
Meerut	+8°3	—14°0	22°3
Gorakhpur	—1°5	—12°1	10°6
Jhansi	+1°8	—11°6	13°4
Agra	+2°3	—11°1	13°4

The following gives the highest maxima of the year exceeding 115° and the dates of their occurrence.

PROVINCE.	STATION.	Highest maximum temperature recorded during the year.	Date on which recorded.
PUNJAB	Khushab	118°9	27th May.
	Mooltan	118°5	20th June.
	Montgomery	117°5	27th May.
	Dera Ismail Khan	117°2	27th May, 10th and 20th June.
	Lahore	116°6	8th June.
	Sialkot	115°9	10th June.
	Sirsa	115°8	13th May.
SIND	Peshawar	115°5	20th June.
	Jacobabad	123°0	20th June.
	Hyderabad	118°7	17th May.
RAJPUTANA	Bikaner	115°8	12th May, 20th and 21st June.
	Pachpadra	115°8	16th May.
	Kotah	115°6	13th May.
ASIATIC TURKEY	Baghdad	118°9	27th June.

III.—The south-west monsoon period.—The temperature variations of this period are usually small in amount and depend upon the distribution and amount of the rainfall. During the monsoon period of 1899 they were unusually large over the area which usually receives its rain from the Bombay monsoon current due to the almost complete failure of these rains from July onwards. The monsoon rains set in somewhat later than usual in the Arabian Sea and extended to the Konkan Coast on the 10th and 11th. They advanced rapidly into the interior as the pressure conditions established during the hot weather were very favourable. The Central Provinces, Central India, Rajputana, the North-Western Provinces and the East Punjab received favourable and satisfactory rain during the next fortnight. The Bombay current decreased rapidly in strength from the 26th and dry weather set in over the central parts of the country.

The Bay current set in about the normal date and began to give general rain to Bengal and the Gangetic Plain from the 15th. It was fairly vigorous until September and gave more abundant rain than usual to North-Eastern India and Burma. The distribution of the rainfall due to this current was in part determined by a series of cyclonic storms and hence the eastern districts of the Central Provinces and Central India obtained occasional rain.

Occasional showers were received in the Deccan and West Coast districts, but the Bombay current gave no heavy general rain after the fourth week of June. The drought was hence most severe in the northern districts depending upon it, including Cutch, Kathiawar, Gujarat and Rajputana.

The following gives the chief features of the temperature conditions of the period :—

1st.—Temperature was more or less considerably above the normal over the whole area dependent upon the Bombay monsoon current during the period from July to September and also on the mean of the whole period. The excess was considerably greater in the night than in the day temperature. The mean temperature was steadily in slight defect in Baluchistan due solely to abnormally low night temperature. The three following tables give data in illustration :—

AREA.	VARIATION OF MEAN MAXIMUM TEMPERATURE FROM NORMAL IN				
	June.	July.	August.	September.	Period, June to September.
Baluchistan (Quetta) .	0	+2'3	+1'9	+0'6	+1'2
Punjab	−0'5	+1'0	+4'9	+5'6	+2'8
Sind	+0'9	+0'9	+2'0	+1'5	+1'3
Rajputana . . .	0	+2'5	+9'4	+6'3	+4'6
Central India . .	−2'6	−1'7	+5'9	+6'7	+2'1
Central Provinces .	+0'3	+1'0	+4'4	+6'1	+3'0
Berar	+1'5	+3'7	+6'6	+9'5	+5'3
Gujarat	−0'8	+2'2	+5'0	+3'1	+2'4
West Coast . . .	+0'3	+2'0	+2'0	+0'3	+1'2
Bombay Deccan . .	−0'4	+2'6	+4'8	+4'7	+2'9
Madras Coast . .	+1'6	+5'7	+2'9	+1'4	+2'9
Madras Deccan . .	+1'6	+4'7	+3'4	+1'4	+2'8
South India . . .	+0'9	+3'1	+3'4	+0'8	+2'1

AREA.	VARIATION OF MEAN MINIMUM TEMPERATURE FROM NORMAL IN				
	June.	July.	August.	September.	Period, June to September.
Baluchistan (Quetta) .	0	0	0	0	0
Punjab	−0'6	−5'3	−3'3	−4'1	−3'3
Sind	+1'0	+2'1	+2'3	+1'8	+1'8
Rajputana	+0'1	−0'1	+0'1	−0'8	−0'2
Central India . . .	+0'6	+2'1	+4'9	+4'3	+3'0
Central Provinces .	−0'8	−0'1	+2'1	+0'9	+0'5
Berar	+1'4	+0'7	+1'4	+1'2	+1'2
Gujarat	+1'5	+1'3	+1'9	+2'5	+1'8
West Coast	+1'5	+1'3	+1'9	+2'5	+1'8
Bombay Deccan . .	−0'4	+1'1	+0'4	−0'3	+0'2
Madras Coast . . .	0	+1'5	+0'9	+0'7	+0'8
Madras Deccan . .	+0'2	+0'7	+0'4	+0'7	+0'5
South India	+0'5	+2'5	+1'4	+0'8	+1'3
	+1'1	+2'2	+1'9	+1'0	+1'6
	+0'8	+1'1	+1'7	+0'5	+1'0

AREA.	VARIATION OF MEAN TEMPERATURE FROM NORMAL IN				
	June.	July.	August.	September.	Period, June to September.
Baluchistan (Quetta) .	0	0	0	0	0
Punjab	−0'3	−1'5	−0'7	−1'8	−1'1
Sind	+0'3	+1'6	+3'6	+3'7	+2'3
Rajputana	+0'5	+0'4	+1'1	+0'4	+0'6
Central India . . .	+0'3	+2'3	+7'2	+5'3	+3'8
Central Provinces .	−1'7	−0'9	+4'0	+3'8	+1'3
Berar	+0'9	+0'9	+2'9	+3'7	+2'1
Gujarat	+1'5	+2'5	+4'3	+6'0	+3'6
West Coast	−0'6	+1'7	+2'7	+1'4	+1'3
Bombay Deccan . .	+0'2	+1'8	+1'5	+0'5	+1'0
Madras Coast . . .	−0'1	+1'7	+2'6	+2'7	+1'7
Madras Deccan . .	+1'1	+4'1	+2'2	+1'1	+2'1
South India	+1'4	+3'5	+2'7	+1'2	+2'2
	+0'9	+2'1	+2'6	+0'7	+1'6

The excess in the temperature was most marked in Rajputana and Berar where it averaged nearly 4° for the period.

2nd.—Temperature was generally normal or below it in the area supplied by the Bay current. It was more or less in defect of the normal during the first two months and above the normal in August and September. The deficiency was moderately large in the first two months of the monsoon period in the North-Western Provinces, Oudh and Assam. As is usual in the rains, the variations were more pronounced in the day than in the night temperature.

The following gives comparative data in illustration :—

AREA.	VARIATION OF MEAN MAXIMUM TEMPERATURE FROM NORMAL IN				
	June.	July.	August.	September.	Period, June to September.
North-Western Provinces and Oudh.	0	0	0	0	0
Bihar	−3'3	−3'5	+3'6	+4'5	+0'3
Chota Nagpur . . .	−1'4	−3'0	+0'8	+1'4	−0'6
Orissa	+0'3	−1'0	+2'4	+3'5	+1'3
Bengal	−2'0	+0'4	+2'8	+3'1	+1'1
Assam	−1'2	−0'5	+1'1	+1'3	+0'2
Burma, Upper . . .	−2'4	−2'7	−0'6	−1'4	−1'8
Burma, Lower . . .	−1'5	−1'3	+0'4	−0'3	−0'7
	−0'4	+0'5	+0'6	+0'7	+0'4

AREA.	VARIATION OF MEAN MINIMUM TEMPERATURE FROM NORMAL IN				
	June.	July.	August.	September.	Period, June to September.
	0	0	0	0	0
North-Western Provinces and Oudh.	-1'9	-1'0	+1'6	+0'1	-0'3
Bihar	+0'1	-0'7	+0'4	+0'2	0
Chota Nagpur	+0'3	+0'2	+1'6	+0'7	+0'7
Orissa	-0'8	-0'3	+1'2	+0'6	+0'2
Bengal	-0'2	0	+0'9	+0'7	+0'4
Assam	-0'9	-0'4	+0'2	-0'2	-0'3
Burma, Upper	-0'4	+0'5	+0'9	+0'8	+0'5
Burma, Lower	+0'2	+1'0	+1'2	+1'7	+1'0

AREA.	VARIATION OF MEAN TEMPERATURE FROM NORMAL IN				
	June.	July.	August.	September.	Period, June to September.
	0	0	0	0	0
North-Western Provinces and Oudh.	-2'6	-2'3	+2'6	+2'3	0
Bihar	-0'7	-1'9	+0'6	+0'8	-0'3
Chota Nagpur	+0'3	-0'4	+2'0	+2'1	+1'0
Orissa	-1'4	+0'1	+2'0	+1'9	+0'8
Bengal	-0'7	-0'3	+1'0	+1'0	+0'3
Assam	-1'7	-1'6	-0'2	-0'8	-1'1
Burma, Upper	-1'0	-0'4	+0'7	+0'3	-0'1
Burma, Lower	-0'1	+0'8	+0'9	+1'2	+0'7

The variations on the mean of the period were small and exceeded 1° only in Assam, where the mean temperature of the period was 1°·1 below the normal.

IV.—The retreating south-west monsoon period.—The temperature conditions and their variations from the normal were as large and pronounced during this period as during the preceding period. They were in part a legacy of the south-west monsoon period and in part due to the deficient rainfall in the Peninsula during the period, October to December.

During the first week of October weather was fine and dry. A cyclonic storm, which formed in the second week of the month, passed north-eastwards into Bengal and gave fairly general rain in the south and east of the

Peninsula, Bengal, Orissa, Assam and Upper Burma from the 12th to the 16th. A diffused disturbance gave general rain to Bengal, Bihar, Assam and Burma from the 21st to the end of the month. Light rain also fell during this period in South and East Madras. Temperature was steadily in excess during the month over the large area which received no rain, including Rajputana, Central India, North Bombay, Berar, the Central Provinces and the Deccan.

Fine settled weather obtained in November over the greater part of the interior of India. The Bay humid current was chiefly directed toward Burma and Assam and these provinces received more rain than usual at the expense of the Madras Coast districts. There was only one period of unsettled weather in the Bay during the month (from the 8th to the 12th). A very severe squall or small cyclonic storm struck the South Coromandel Coast at Negapatam on the 12th and gave moderate to heavy rain in South Madras and Ceylon. Four feeble depressions affected the weather slightly in Upper India, giving rise to moderate temperature variations of slight importance. The chief features of the temperature conditions of the month were, (1) excessive temperature over nearly the whole of the interior including the Punjab, Rajputana, Sind, Central India, North Bombay, Berar, the Central Provinces and the Deccan, and (2) slight to moderate deficiency in Burma, Assam and Bengal.

Weather was finer and less disturbed than usual in December. The south-west humid winds withdrew from the Bay considerably earlier than usual, in the last week of November or first week of December. Hence little rain fell in the Coromandel Coast districts or in Southern India. Several feeble depressions which formed in the Persian area affected the weather slightly in Upper India, giving cloud and light showers of little importance in the plains and hills.

The variations of the temperature conditions from the normal in this month were even more pronounced than in October or November. Temperature was largely and steadily in excess in the large area including Rajputana, Central India, North Bombay, Berar, the Central Provinces and the Deccan. The excess was greatest in Khandesh, the Bombay Deccan, Berar and the Central Provinces from the 1st to the 14th and in Rajputana, Cutch, Kathiawar and Gujarat from the 15th to the 23rd, and in Baluchistan and the Punjab from the 26th to the 31st.

The following summarizes the chief temperature conditions of the period:—

(1) The chief feature of the temperature conditions was the large excess of temperature over by far the greater part of the interior, including Sind, the Punjab

Rajputana, Central India, the North-Western Provinces, the Central Provinces, Berar, the Deccan and North Bombay. The excess was, as a rule, most marked in the day temperature.

The following gives data in illustration :—

AREA.	VARIATION OF MEAN MAXIMUM TEMPERATURE FROM NORMAL IN			
	October.	November.	December.	Period, October to December.
	°	°	°	°
Punjab	+1'4	+2'0	+3'5	+2'3
Rajputana	+4'7	+4'6	+4'9	+4'7
Sind	+2'3	+3'5	+5'0	+3'6
Gujarat	+6'5	+5'6	+6'2	+6'1
North-Western Provinces and Oudh.	+4'2	+3'8	+3'5	+3'8
Central India	+7'5	+6'8	+5'6	+6'6
Central Provinces	+7'0	+7'2	+6'3	+6'8
Berar	+10'0	+9'0	+8'2	+9'1
Bombay Deccan	+8'3	+7'0	+4'6	+6'6
Madras Deccan	+5'0	+5'6	+4'1	+4'9

The mean maximum temperature was in large excess over the greater part of this area. The excess was abnormally large in Berar, where it averaged 9°·1.

AREA.	VARIATION OF MEAN MINIMUM TEMPERATURE FROM NORMAL IN			
	October.	November.	December.	Period, October to December.
	°	°	°	°
Punjab	-0'7	+5'4	+4'2	+3'0
Rajputana	+2'7	+6'0	+5'4	+4'7
Sind	-2'8	+2'8	+4'8	+1'6
Gujarat	+0'6	+2'4	+5'3	+2'8
North-Western Provinces and Oudh.	-0'9	+2'0	+2'2	+1'1
Central India	+1'3	+2'7	+3'8	+2'6
Central Provinces	-0'4	+0'8	+3'4	+1'3
Berar	+2'8	+1'4	+4'0	+2'7
Bombay Deccan	+1'6	-0'3	+1'1	+0'8
Madras Deccan	+1'0	-1'2	-0'9	-0'4

The night temperature was in general excess in the same areas, but by smaller amounts than the day tem-

perature. The excess was greatest in Rajputana where it averaged 4°·7 for the period.

AREA.	VARIATION OF MEAN TEMPERATURE FROM NORMAL IN			
	October.	November.	December.	Period, October to December.
	°	°	°	°
Punjab	+0'4	+3'7	+3'9	+2'7
Rajputana	+3'7	+5'3	+5'2	+4'7
Sind	-0'3	+3'2	+4'9	+2'6
Gujarat	+3'6	+4'0	+5'3	+4'5
North-Western Provinces and Oudh.	+1'7	+2'9	+2'9	+2'5
Central India	+4'4	+4'8	+4'7	+4'6
Central Provinces	+3'3	+4'0	+4'9	+4'1
Berar	+6'4	+5'2	+6'1	+5'9
Bombay Deccan	+5'0	+3'4	+2'9	+3'8
Madras Deccan	+3'0	+2'2	+1'6	+2'3

The mean temperature of the period was 6° above the normal in Berar and 5° in Rajputana, Central India and Gujarat, the areas of greatest drought during the previous monsoon rains.

The excess was greatest in the central area including the western and southern districts of the Central Provinces, Berar, Khandesh, Central India and North Bombay, and defined by the stations for which comparative data are given in the three following tables :—

STATION.	VARIATION OF MAXIMUM TEMPERATURE FROM NORMAL IN			
	October.	November.	December.	Period, October to December.
	°	°	°	°
Akola	+10'8	+9'0	+8'2	+9'3
Amraoti	+9'2	+8'2	+7'2	+8'2
Khandwa	+11'5	+9'5	+7'6	+9'5
Chanda	+7'8	+6'0	+7'0	+7'8
Nagpur	+8'2	+8'1	+7'2	+7'8
Malegaon	+11'2	+9'6	+6'8	+9'2
Indore	+9'0	+8'2	+6'3	+7'8
Surat	+8'9	+7'8	+7'2	+8'0
Deesa	+7'2	+4'8	+5'2	+5'7
Neemuch	+7'5	+6'0	+5'7	+6'4

STATION.	VARIATION OF MINIMUM TEMPERATURE FROM NORMAL IN			
	October.	November.	December.	Period, October to December.
Akola	+2'0	+1'4	+4'0	+2'5
Amraoti	+3'5	?	?	?
Khandwa	+2'9	+2'3	+4'7	+3'3
Chanda	+2'3	+1'1	+2'3	+0'4
Nagpur	+0'1	+0'9	+3'9	+1'6
Malegaon	+3'3	+2'0	+3'2	+2'8
Indore	+2'1	+1'7	+3'3	+2'4
Surat	+2'2	+2'6	+4'6	+3'1
Deesa	+5'0	+5'7	+7'9	+6'2
Neemuch	+3'2	+4'3	+5'0	+4'2

STATION.	VARIATION OF MEAN TEMPERATURE FROM NORMAL IN			
	October.	November.	December.	Period, October to December.
Akola	+6'4	+5'2	+6'1	+5'9
Amraoti	+6'4	?	?	?
Khandwa	+7'2	+5'9	+6'2	+6'4
Chanda	+2'8	+3'8	+4'7	+3'8
Nagpur	+4'2	+4'5	+5'6	+4'8
Malegaon	+7'3	+5'8	+5'0	+6'0
Indore	+5'6	+5'0	+4'8	+5'1
Surat	+5'6	+5'2	+5'9	+5'6
Deesa	+6'1	+5'3	+6'6	+6'0
Neemuch	+5'4	+5'2	+5'4	+5'3

The abnormally high temperature in that area during the month of December is shown more fully by the comparative data, day by day, for the stations at which the excess was largest in amount.

DATE.	STATION.	VARIATION FROM NORMAL OF		
		Maximum temperature of date.	Minimum temperature of date.	Mean temperature of date.
4th December	Khandwa	+10'1	+5'9	+8'0
5th "	Akola	+9'9	+15'7	+12'8
6th "	Akola	+10'7	+12'2	+11'5
7th "	Akola	+9'7	+14'9	+12'3

DATE.	STATION.	VARIATION FROM NORMAL OF		
		Maximum temperature of date.	Minimum temperature of date.	Mean temperature of date.
8th December	Khandwa	+9'2	+9'0	+9'1
9th "	Chanda	+11'6	+7'2	+9'4
10th "	Chanda	+10'7	+8'2	+9'5
11th "	Akola	+7'4	+10'0	+8'7
12th "	Khandwa	+5'3	+15'5	+10'5
13th "	Malegaon	+5'1	+12'4	+8'8
14th "	Surat	+7'1	+9'6	+8'4
15th "	Deesa	+5'5	+13'0	+9'3
16th "	Saugor	+7'7	+10'3	+9'0
17th "	Neemuch	+8'2	+9'7	+9'0
18th "	Khandwa	+10'4	+13'2	+11'8
19th "	Deesa	+7'2	+14'1	+10'7
20th "	Deesa	+7'5	+11'4	+9'5
21st "	Deesa	+6'0	+10'8	+8'4
22nd "	Bhuj	+10'2	+4'2	+7'2
23rd "	Bikaner	+11'2	+13'0	+12'1
24th "	Bikaner	+9'9	+10'2	+10'1

Higher day temperatures were registered in these areas in the months of November and December than have been previously recorded. The following gives data in illustration:—

STATION.	Highest maximum temperature recorded in November.	Date on which recorded.	Highest maximum temperature recorded in November previous to 1899.	Year in which recorded.
Ahmedabad	102'3	5th	98'2	1896
Surat	101'7	1st	97'7	1878 and 1898
Kurrachee	98'4	3rd and 5th	96'8	1886
Bhavnagar Para	98'1	1st and 2nd	97'6	1898
Kotah	98'0	1st	97'5	1898
Akola	97'5	3rd	96'5	1896
Jaipur	96'2	1st	94'5	1895 and 1898
Chanda	96'2	2nd and 3rd	94'9	1877 and 1896
Nagpur	96'1	2nd	94'8	1896
Sutna	94'5	3rd	92'4	1896
Cawnpore	94'3	1st	93'3	1895, 1896 and 1897
Saugor	93'3	3rd	92'3	1896
Khandwa	98'7	1st and 5th	97'7	1896

STATION.	Highest maximum temperature recorded in December.	Date on which recorded.	Highest maximum temperature recorded in December previous to 1899.	Year in which recorded.
Agra	85°5	3rd, 4th, 5th and 31st.	85°2	1889
Sirsa	88°7	1st	87°0	1889
Lahore	86°6	"	81°8	1889
Montgomery	86°0	"	84°3	1894
Umballa	83°0	2nd	80°0	1898
Sialkot	82°0	"	80°1	1878
Rawalpindi	82°0	"	79°0	1886
Deesa	95°6	1st, 2nd and 3rd	94°8	1891
Pachpadra	92°7	2nd	90°5	1894
Bikaner	88°2	1st and 2nd	85°0	1886
Jaipur	87°2	3rd	86°2	1889
Sambhar	86°9	30th	84°9	1894
Hyderabad (Sind)	92°1	3rd and 11th	91°6	1897
Kurrachee	90°4	1st	89°4	1898
Surat	97°2	1st, 2nd and 3rd	96°7	1896
Ahmedabad	96°2	3rd	94°2	1896
Veraval	95°1	1st	94°6	1896
Bhuj	92°8	2nd	91°5	1877
Malegaon	98°4	7th	95°5	1896
Raichur	96°6	17th	89°6	1891

(2) Temperature was in defect on the mean of the period in Burma, Assam, Bengal and North Bihar. This deficiency was small in amount in October but increased in November and December and was slight to considerable in amount in the latter month. The following gives comparative data :—

AREA.	VARIATION OF MEAN MAXIMUM TEMPERATURE FROM NORMAL IN			
	October.	November.	December.	Period, October to December.
	°	°	°	°
Lower Burma	+1°8	—1°2	—0°9	—0°1
Upper Burma	—0°9	—2°3	—2°1	—1°8
Assam	—1°4	—1°0	—3°4	—1°9
Bengal	—0°7	—0°2	—0°2	—0°4
North Bihar	+0°4	—0°6	—1°3	—0°5

AREA.	VARIATION OF MEAN MINIMUM TEMPERATURE FROM NORMAL IN			
	October.	November.	December.	Period, October to December.
	°	°	°	°
Lower Burma	+0°7	—0°8	—2°0	—0°7
Upper Burma	+1°3	—0°1	—1°3	0
Assam	—0°4	—1°3	—1°2	—1°0
Bengal	—0°3	—2°3	—0°3	—1°0
North Bihar	+0°3	—0°7	+0°6	+0°1

AREA.	VARIATION OF MEAN TEMPERATURE FROM NORMAL IN			
	October.	November.	December.	Period, October to December.
	°	°	°	°
Lower Burma	+1°3	—1°0	—1°5	—0°4
Upper Burma	+0°2	—1°2	—1°7	—0°9
Assam	—0°9	—1°2	—2°3	—1°5
Bengal	—0°5	—1°3	—0°3	—0°7
North Bihar	+0°4	—0°7	—0°4	—0°2

The year.—The following table gives the variations of the mean temperature of Extra-Tropical and Tropical India and also of the whole of India from the normal month by month, during the year 1899 :—

MONTH.	VARIATION FROM NORMAL OF MEAN DAILY TEMPERATURE IN		
	Extra-Tropical India from Table II.	Tropical India from Table II.	Whole India from Table II.
	°	°	°
January	—3°5	—0°9	—2°2
February	+1°4	+0°4	+0°9
March	+2°5	+0°8	+1°6
April	—0°7	—1°5	—1°1
May	+2°1	—0°4	+0°8
June	—0°1	+0°3	+0°1
July	+0°2	+1°7	+0°9
August	+1°8	+2°2	+2°0
September	+1°7	+1°6	+1°6
October	+1°3	+2°6	+2°0
November	+1°2	+1°1	+1°2
December	+2°0	+1°0	+1°5
Whole year	+0°8	+0°7	+0°8

The preceding data indicate the chief variations of the mean temperature of the Indian land area from month to month during the year. The following gives the more important features:—

The most important feature of the mean temperature of the year was the excess over the whole Indian area excluding Burma, Assam, Bengal, Bihar and the eastern districts of the North-Western Provinces. The following gives comparative data:—

AREA.	VARIATION FROM NORMAL OF		
	Mean maximum temperature.	Mean minimum temperature.	Mean daily temperature.
	°	°	°
Baluchistan (Quetta)	+1'7	-0'3	+0'7
Punjab	+2'3	+2'3	+2'3
Rajputana	+3'4	+2'5	+3'0
Sind.	+2'0	+0'3	+1'2
Central India	+2'6	+1'0	+1'8
Chota Nagpur	+1'3	+0'3	+0'8
Central Provinces	+2'5	+0'8	+1'7
Berar	+3'7	+1'2	+2'5
West Coast	+0'5	+0'1	+0'3
Bombay Deccan	+2'3	-0'1	+1'1
Madras Coast	+1'4	+0'3	+0'9
Madras Deccan	+1'8	+0'2	+1'0
South India	+0'2	0	+0'1

The excess was hence most pronounced in the central area including the Punjab, Rajputana, the western districts of Central India, Berar, the west and south of the Central Provinces and Gujarat in which it ranged between 2°0 and 3°5. It was 3" or upwards at stations for which data are given below:—

STATION.	VARIATION FROM NORMAL OF		
	Maximum temperature.	Minimum temperature.	Mean temperature.
	°	°	°
Sialkot	+3'5	+3'3	+3'4
Lahore	+2'9	+3'1	+3'0
Bikaner	+3'1	+2'8	+3'0
Deesa	+4'0	+2'0	+3'0
Ajmer	+3'4	+3'2	+3'3
Jhansi	+2'6	+3'4	+3'0

The second important feature of the mean temperature of the year was a slight deficiency in the area comprising Upper and Central Burma, Assam, Bengal, Bihar and the

eastern district of the North-Western Provinces. The following gives data:—

AREA.	VARIATION FROM NORMAL OF		
	Mean maximum temperature.	Mean minimum temperature.	Mean daily temperature.
	°	°	°
Lower Burma	-0'3	+0'6	+0'2
Burma (Central and Upper)	-0'8	+0'3	-0'3
Assam	-1'0	-0'6	-0'8
Bengal	-0'1	0	-0'1
Bihar	-0'4	+0'3	-0'1
North-Western Provinces (East)	+0'2	-0'3	-0'1

The following table gives the progressive variation of the mean actual temperature of the past 25 years:—

YEAR.	Number of stations.	Mean anomaly.	Progressive variation.
		°	°
1875	72	-0'29	...
1876	72	-0'03	+0'21
1877	74	+0'17	+0'25
1878	74	+0'62	+0'45
1879	70	-0'13	-0'75
1880	106	-0'13	+0'26
1881	110	-0'01	-0'14
1882	113	-0'11	-0'10
1883	122	-0'48	-0'37
1884	122	-0'61	-0'13
1885	118	-0'29	+0'32
1886	122	+0'08	+0'37
1887	126	-0'23	-0'31
1888	127	+0'36	+0'59
1889	81	+0'86	+0'50
1890	85	+0'13	+0'73
1891	72	-0'03	-0'16
1892	74	+0'66	+0'09
1893	68	-1'33	-1'99
1894	66	+0'11	+1'44
1895	69	+0'35	+0'24
1896	67	+1'30	+2'05
1897	75	+0'90	-0'40
1898	75	+0'65	-0'25
1899	52	+0'78	+0'13

Atmospheric Pressure.

Full information of the barometers in use at Indian observatories and of the methods of reducing the observations and obtaining the mean daily and monthly pressure will be found in the annual reports formerly issued by the Department (*e.g.*, pages 58 and 59 of the report for 1890) and also in pages 8-9 of the monthly review for January 1899.

In Table II of each monthly review the monthly mean daily pressure (corrected for temperature) is given in the fifth figure column, and the variation from the normal in the sixth figure column. The normal monthly mean pressure values were recalculated for all first and second class stations in 1896, and will be found in Table VI of the Annual Summary for that year. The additional data for the years 1891-1895 were utilized in calculating these means, which are hence based upon the whole of the available data up to the year 1896. The variation data in the monthly reviews for the year 1899 were obtained by a comparison of the actual monthly means with the corresponding normal monthly means published in the Annual Summary for 1896, and the variations of the monthly pressures of all first and second class stations in 1899 are given in Table V (below). The figures in the fifth and sixth figure columns of Table II appended to the present Annual Summary, giving data of the mean pressure of the air and its variation from the normal for all first and

second class stations, are comparable with the corresponding data of previous years published in the annual reports and summaries.

In the seventh figure column of Table II in each monthly review the mean pressures reduced to sea-level and corrected to constant gravity (Lat. 45°) are given. These, it should be noted, are not comparable with the sea-level pressure values of the years 1875-90 as given in the annual reports for those years, for previously to 1891 no correction was made to reduce the monthly pressure means to standard gravity.

In Table I of each monthly review and also in that appended to the Annual Summary, the pressure data are given for a fixed hour (*viz.*, 8 A.M., local time) of the day. The second figure column in those tables gives the mean 8 A.M. pressures for the month corrected for temperature. In the third figure column the variations of the mean 8 A.M. pressures from the normal mean 8 A.M. pressures are exhibited.

Normal 8 A.M. mean monthly data for the great majority of stations will be found in the Annual Summary of 1894, Tables VII and VIII.

The mean pressure data for the year 1899 will be found under the headings "Pressure" in Tables I and II appended to the present Annual Summary.

TABLE V.—Comparison of monthly mean pressures in 1899 with the averages of past years.

METEOROLOGICAL PROVINCE.	STATION.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	YEAR.
		"	"	"	"	"	"	"	"	"	"	"	"	"
BURMA COAST AND BAY ISLANDS.	Port Blair .	—'004	—'008	—'003	+ '010	+ '004	+ '045	+ '020	—'005	+ '038	+ '041	+ '047	+ '028	+ '018
	Rangoon .	—'021	—'027	—'021	—'009	—'008	+ '033	—'018	—'033	+ '010	+ '037	+ '029	—'006	—'003
	Diamond Island.	—'011	—'021	—'018	—'004	—'036	+ '028	—'011	—'028	+ '016	+ '042	+ '040	+ '007	0
	Cocos Island .	—'011	—'030	—'007	?	0	+ '014	—'004	—'037	+ '013	+ '028	+ '031	—'007	—'001
	Akyab .	—'018	—'026	—'021	—'010	—'036	+ '020	—'027	—'029	+ '011	+ '045	+ '023	—'005	—'006
BENGAL AND ORISSA.	Chittagong .	—'012	—'045	—'035	—'014	—'046	+ '008	—'042	—'034	0.	+ '034	+ '021	—'012	—'015
	Calcutta (Alipur)	+ '002	—'038	—'030	+ '003	—'033	+ '036	+ '006	—'018	+ '035	+ '054	+ '025	—'013	+ '002
	Saugor Island .	—'005	—'047	—'036	—'002	—'049	+ '034	+ '015	—'013	+ '042	+ '056	+ '034	—'010	+ '002
	False Point .	—'011	—'047	—'034	+ '001	—'051	+ '024	+ '010	—'038	+ '034	+ '042	+ '023	—'017	—'005
GANGETIC PLAIN AND CHOTA NAGPUR.	Hazaribagh .	—'017	—'050	—'014	+ '004	—'016	+ '014	+ '011	—'006	+ '052	+ '039	+ '011	—'016	+ '001
	Darbhanga .	+ '010	—'048	—'029	+ '010	—'039	+ '006	—'011	—'024	+ '019	+ '032	+ '021	—'022	—'006
	Allahabad .	+ '010	—'056	—'021	0	—'027	+ '004	+ '010	—'003	+ '044	+ '028	+ '003	—'025	—'003

TABLE V.—Comparison of monthly mean pressures in 1899 with the averages of past years—contd.

METEOROLOGICAL PROVINCE.	STATION.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	YEAR.
		"	"	"	"	"	"	"	"	"	"	"	"	"
UPPER SUB-HIMALAYAS.	Dehra Dun .	-.011	-.053	-.010	-.005	-.036	-.016	-.012	-.011	+.017	+.028	+.001	-.016	-.010
	Roorkee .	0	-.058	-.016	+.003	-.025	+.001	0	-.018	+.017	+.032	+.002	-.024	-.007
	Meerut .	-.004	-.064	-.020	-.004	-.035	-.005	-.006	-.024	+.018	+.021	-.012	-.032	-.014
	Lahore .	+.008	-.063	-.009	-.014	-.049	-.014	-.027	-.018	+.024	+.031	-.012	-.023	-.014
INDUS VALLEY AND NORTH-WEST RAJ-PUTANA.	Ludhiana .	+.013	-.059	-.010	-.001	-.032	-.009	-.018	-.012	+.019	+.031	-.003	-.015	-.008
	Peshawar .	-.009	-.051	-.007	-.023	-.074	-.043	-.041	-.022	+.010	+.020	-.007	-.020	-.022
	Jacobabad .	+.012	-.066	-.007	-.019	-.039	-.032	-.026	0	+.040	+.033	-.007	-.032	-.012
EAST RAJPUTANA, CENTRAL INDIA AND GUJARAT.	Kurrachee .	+.035	-.046	+.014	-.030	-.030	-.016	+.030	+.038	+.061	+.016	+.010	-.026	+.005
	Jaipur .	+.013	-.045	+.015	-.013	-.022	+.002	+.026	+.021	+.052	+.023	+.005	-.004	+.006
	Deesa .	+.025	-.038	+.003	-.031	-.020	-.009	+.035	?	+.058	+.001	+.009	-.002	+.003
DECCAN .	Belgaum .	-.012	-.031	-.005	-.001	-.004	-.006	+.040	+.021	+.039	+.010	+.033	+.013	+.008
	Sholapur .	-.005	-.037	-.003	+.009	-.006	-.004	+.038	+.016	+.045	+.015	+.029	+.009	+.009
	Poona .	+.002	-.024	+.006	+.006	-.002	+.001	+.057	+.038	+.059	+.013	+.032	+.016	+.017
	Akola .	+.007	-.033	+.006	+.012	-.010	+.002	+.046	+.023	+.051	+.014	+.010	+.001	+.011
	Buldana .	+.005	-.030	+.009	+.001	-.013	-.002	+.043	+.028	+.056	+.016	+.017	+.011	+.012
	Khandwa .	+.020	-.027	+.016	-.001	-.001	+.006	+.055	+.039	+.064	+.015	+.014	+.010	+.018
	Nagpur .	+.009	-.021	+.016	+.022	-.009	+.006	+.053	+.022	+.071	+.041	+.018	+.006	+.020
WEST COAST .	Hyderabad (Deccan). .	-.007	-.036	?	+.020	-.012	+.012	+.038	+.022	+.052	+.032	+.020	-.002	+.013
	Bombay .	+.011	-.021	-.007	+.003	0	+.002	+.078	+.045	+.073	+.018	+.037	+.016	+.021
	Karwar .	-.006	-.030	-.007	-.006	+.002	0	+.040	+.030	+.060	+.032	+.066	+.022	+.017
SOUTH INDIA .	Salem .	0	-.034	-.007	0	-.017	-.003	-.003	-.022	+.023	+.017	+.045	+.023	+.002
	Chitaldroog .	+.004	-.036	+.013	+.008	-.011	+.018	+.025	+.018	+.045	+.026	+.032	+.007	+.012
	Bangalore .	-.012	-.032	-.003	-.001	-.004	+.007	+.020	+.007	+.032	+.014	+.046	+.014	+.007
	Hassan .	+.007	-.030	+.015	+.002	-.014	+.019	+.023	+.011	+.035	+.014	+.033	+.012	+.011
	Mysore .	+.004	-.036	+.016	0	-.013	+.023	+.021	+.006	+.038	-.015	+.031	+.013	+.010
	Madras .	-.001	-.031	-.004	+.007	-.004	+.012	+.018	-.010	+.032	+.025	+.051	+.033	+.011
	Bellary .	-.013	-.040	-.003	+.001	-.008	+.002	+.027	+.008	+.038	+.014	+.036	+.013	+.006
HILL STATION BALUCHISTAN .	Cocanada .	-.007	-.048	+.003	+.020	-.003	+.025	+.024	+.003	+.056	+.025	+.022	+.004	+.010
	Vizagapatam .	-.005	-.036	-.008	+.011	-.032	+.026	?	?	?	?	?	?	?
	Quetta .	+.023	-.014	+.023	+.002	+.001	-.012	+.020	+.026	+.050	+.043	+.016	+.001	+.015
HILL STATIONS. NORTHERN INDIA .	Leh .	+.042	+.055	+.059	-.016	+.031	-.006	+.001	+.016	+.034	+.054	+.022	-.009	+.024
	Srinagar .	+.048	+.010	+.028	+.006	-.007	-.028	-.018	+.031	+.062	+.058	+.009	-.025	+.011
	Simla (Ridge) .	-.026	-.008	+.039	-.001	+.003	-.007	-.002	+.019	+.041	+.048	+.030	+.009	+.012
	Chakrata .	-.035	-.018	+.024	-.009	-.002	-.007	-.003	+.010	+.030	+.048	+.017	-.007	+.004
	Ranikhet .	-.018	-.017	+.025	+.002	-.007	-.012	-.015	0	+.036	+.056	+.025	+.003	+.007
	Katmandu .	-.009	-.044	-.079	-.058	?	?	?	?	?	?	?	?	?
	Darjeeling .	-.023	-.030	-.028	-.031	-.021	+.015	+.015	+.013	+.035	+.061	+.044	+.004	+.005

TABLE V.—Comparison of the monthly mean pressure in 1899 with the averages of past years—concl'd.

METEOROLOGICAL PROVINCE.	STATION.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	YEAR.
HILL STATIONS, CENTRAL INDIA.	Mount Abu .	-.021	-.052	+.015	-.031	-.024	-.007	+.020	+.043	+.045	-.003	0	+.002	-.001
	Pachmarhi .	-.008	-.027	+.016	-.014	-.017	-.001	+.039	+.031	+.069	+.035	+.026	+.020	+.014
	Chikalda .	-.019	-.025	+.016	-.003	-.009	+.005	+.041	+.031	+.063	+.032	+.029	+.015	+.015
HILL STATION, SOUTHERN INDIA.	Wellington .	-.018	-.031	+.003	-.024	-.015	-.002	+.011	-.003	+.022	+.016	+.031	+.009	0
EXTRA INDIAN STATIONS.	Aden .	+.029	-.020	0	-.012	+.003	+.043	+.063	+.039	+.068	+.044	+.024	-.008	+.023
	Perim .	+.048	-.010	+.008	-.009	-.007	+.039	+.022	0	+.046	+.044	+.015	-.007	+.016
	Zanzibar .	+.024	-.032	+.005	+.008	0	+.029	+.020	+.012	+.048	+.007	-.002	-.012	+.009
	Port Victoria (Seychelles).	-.003	-.028	+.012	-.001	-.017	+.029	+.012	+.018	+.043	+.024	+.028	-.003	+.010
	Mauritius .	-.036	-.037	-.023	-.008	-.007	-.007	+.064	+.051	+.014	-.007	-.020	+.023	+.001

The following tables give summaries of the pressure variation data according to the two groups of divisions employed in the corresponding tables of temperature variation data, that is, for the eighteen divisions for which

the variation data were given in the "Geographical Summaries" in the annual reports previous to 1891 and the eleven meteorological provinces in Table I of each monthly review:—

TABLE VI.—Geographical summary of the pressure variation data of Table II in the monthly weather reviews of 1899.

METEOROLOGICAL PROVINCE.	Number of stations.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	YEAR.
		"	"	"	"	"	"	"	"	"	"	"	"	"
North-West Himalaya .	5	+.002	+.004	+.035	-.004	-.004	-.012	-.007	+.015	+.041	+.043	+.021	-.006	+.011
Sikkim Himalaya and Nepal.	1-2	-.016	-.037	-.054	-.045	-.021	+.015	+.015	+.013	+.035	+.061	+.044	+.004	-.001
Punjab Plains .	3	+.004	-.058	-.009	-.013	-.052	-.022	-.029	-.017	+.018	+.027	-.007	-.019	-.015
Gangetic Plain .	5	+.001	-.056	-.019	+.001	-.032	-.002	-.004	-.016	+.023	+.028	+.003	-.024	-.008
Western Rajputana .	3-4	+.013	-.051	+.006	-.028	-.028	-.016	+.015	+.027	+.051	+.012	+.003	-.015	-.001
Eastern Rajputana and Central India.	1	+.013	-.045	+.015	-.013	-.022	+.002	+.026	+.021	+.052	+.023	+.005	-.004	+.006
Nerbudda Valley .	1	+.020	-.027	+.016	-.001	-.001	+.006	+.055	+.039	+.064	+.015	+.014	+.010	+.018
Chota Nagpur .	1	-.007	-.050	-.014	+.004	-.016	+.014	+.011	-.006	+.052	+.039	+.011	-.016	+.001
Lower Bengal .	2	-.002	-.043	-.033	-.001	-.041	+.035	+.011	-.016	+.039	+.055	+.030	-.012	+.002
Orissa .	1	-.011	-.047	-.034	+.001	-.051	+.024	+.010	-.038	+.034	+.042	+.023	-.017	-.005
Central Provinces (South) and Berar.	5	-.001	-.027	-.013	+.004	-.012	+.002	+.044	+.027	+.062	+.028	+.020	+.011	+.012
Konkan .	2	-.003	-.026	-.007	-.002	+.001	+.001	+.059	+.038	+.067	+.025	+.052	+.019	+.019
Deccan, Hyderabad and Mysore.	8-9	-.004	-.034	+.005	+.005	-.008	+.038	+.039	+.016	+.043	+.017	+.032	+.011	+.011

TABLE VI.—*Geographical summary of the pressure variation data of Table II in the monthly weather reviews of 1899—concl'd.*

METEOROLOGICAL PROVINCE.	Number of stations.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	YEAR.
		"	"	"	"	"	"	"	"	"	"	"	"	"
Eastern Coast and Carnatic.	3-4	-.003	-.037	-.004	+.010	-.014	+.015	+.013	-.010	+.037	+.022	+.039	+.020	+.007
Arakan and Pegu .	4	-.016	-.030	-.024	-.009	-.032	+.022	-.025	-.031	+.009	+.040	+.028	-.004	-.006
Bay Islands .	1-2	-.008	-.019	-.005	+.010	+.002	+.030	-.008	-.021	+.026	+.035	+.039	+.011	+.008
Extra-Tropical India .	23-25	+.002	-.038	-.004	-.010	-.025	-.003	+.002	+.001	+.037	+.032	+.011	-.013	-.001
Tropical India .	26-27	-.005	-.031	-.001	+.002	-.012	+.011	+.023	+.006	+.040	+.025	+.032	+.010	+.008
Whole India .	49-52	-.002	-.035	-.003	-.004	-.019	+.004	+.013	+.004	+.039	+.029	+.022	-.002	+.004

TABLE VII.—*Variations of the mean monthly pressure from the normal in 1899 in the eleven meteorological provinces of India.*

METEOROLOGICAL PROVINCE.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	YEAR.
	"	"	"	"	"	"	"	"	"	"	"	"	"
Burma Coast and Bay Islands	-.014	-.026	-.026	-.015	-.024	+.030	-.020	-.033	+.020	+.044	+.047	+.014	0
Burma Inland . . .	+.007	-.031	-.002	-.002	-.017	+.033	-.054	-.026	+.027	+.051	+.011	+.018	+.001
Assam	-.010	-.037	-.012	+.009	-.044	+.013	-.026	-.036	+.015	+.053	+.036	+.003	-.003
Bengal and Orissa . .	-.007	-.044	-.022	+.009	-.042	+.022	-.011	-.027	+.024	+.049	+.038	+.006	0
Gangetic Plain and Chota Nagpur.	-.009	-.049	-.026	+.013	-.026	+.002	-.008	-.016	+.030	+.039	+.016	-.012	-.004
Upper Sub-Himalayas . .	0	-.048	-.010	+.005	-.025	-.005	-.021	-.012	+.024	+.034	+.006	-.014	-.006
Indus Valley and North-West Rajputana	+.015	-.054	-.007	-.018	-.047	-.025	-.020	+.009	+.038	+.035	+.001	-.022	-.008
East Rajputana, Central India and Gujarat.	+.007	-.041	+.006	-.015	-.008	-.005	+.032	+.039	+.060	+.018	+.012	-.004	+.008
Deccan	-.002	-.035	+.001	+.004	-.006	+.007	+.040	+.024	+.066	+.031	+.029	+.015	+.015
West Coast	-.006	-.029	-.007	-.002	+.009	+.005	+.040	+.026	+.055	+.018	+.062	+.025	+.016
South India	-.009	-.035	-.009	+.001	-.005	+.014	+.022	+.002	+.036	+.023	+.061	+.031	+.011

I.—The cold weather period.—The mean pressure of the Indian area was normal in amount in January and in large defect in February.

The weather was less disturbed and drier than usual in January. It was, on the other hand, somewhat more unsettled than usual in February in parts of North-Western India due to the advance of a series of six cold weather depressions across Baluchistan and Northern India during the month. They were, however, very feeble and the accompanying precipitation of the month was generally below the normal over the plains of India.

Pressure in both months was in slight to moderate relative excess in the Central Provinces, Berar, Konkan, Gujarat, Kathiawar, Cutch and Central India and in slight defect in the greater part of Bengal. The following table

gives the mean pressure anomalies in different parts of India for the period:—

AREA.	PRESSURE ANOMALY.		
	January.	February.	Period, January and February.
Baluchistan (Quetta)	+.030	+.031	+.031
Punjab	+.010	-.009	+.001
Sind	+.029	-.013	+.008
North-Western Provinces and Oudh .	-.003	-.012	-.008
Rajputana	+.009	-.007	+.001

AREA.	PRESSURE ANOMALY.		
	January.	February.	Period, January and February.
	"	"	"
Gujarat	+ '018	+ '007	+ '013
Central India	+ '005	+ '007	+ '006
Central Provinces	+ '003	+ '005	+ '004
Berar	+ '012	+ '021	+ '017
Bihar	- '002	- '007	- '005
Chota Nagpur	- '020	- '003	- '012
Bengal	- '005	- '007	- '006
Assam	- '007	+ '003	- '002
Orissa	- '004	- '001	- '003
Bombay Deccan	- '004	+ '006	+ '001
West Coast	- '003	+ '011	+ '004
Madras Deccan	- '009	- '002	- '006
Madras Coast	- '002	+ '008	+ '003
South India	- '011	+ '003	- '004
Burma	- '003	+ '012	+ '005
Andamans (Port Blair)	- '001	+ '032	+ '016
Ceylon (Colombo)	- '008	+ '014	+ '003

The only important local features of the pressure conditions were a moderate excess in Sind and Cutch (and probably Baluchistan) in January and a moderate excess in Tenasserim and a moderate deficiency in Upper Sind and the South-West Punjab in February. Elsewhere the local variations were small, and on the mean of the period the only marked feature was a moderate local excess of pressure in Berar and the western districts of the Central Provinces. Comparative data are given below for stations in that area:—

STATION.	PRESSURE ANOMALY.		
	January.	February.	Period, January and February.
	"	"	"
Khandwa	+ '023	+ '020	+ '022
Akola	+ '012	+ '019	+ '016
Amraoti	+ '012	+ '023	+ '018

Pressure in January was in large relative defect at the level of the hill stations in Northern India and in large excess in February and was hence in slight to moderate excess on the mean of the period in the case of the

majority of the hill stations in the North-West Himalayas and in Baluchistan. The following gives data for eight pairs of stations:—

HILL AND PLAIN STATIONS.	VERTICAL PRESSURE ANOMALY.		
	January.	February.	Period, January and February.
	"	"	"
Leh and Lahore	+ '019	+ '118	+ '069
Murree and Peshawar	- '040	+ '020	- '010
Simla and Ludhiana	- '043	+ '046	+ '002
Ranikhet and Bareilly	- '026	+ '035	+ '005
Chakrata and Roorkee	- '024	+ '048	+ '012
Darjeeling and Dhubri	- '032	+ '021	- '006
Mount Abu and Deesa	- '030	+ '004	- '014
Quetta and Jacobabad	+ '010	+ '057	+ '034

Pressure varied from the normal over the Indian area in January by amounts averaging —'005" for Tropical India and + '002" for Extra-Tropical India and in February it was in defect by amounts averaging —'031" in Tropical India and —'038" in Extra-Tropical India.

The following data for eleven meteorological provinces illustrate the local conditions in India in January and February:—

METEOROLOGICAL PROVINCE.	PRESSURE ANOMALY.		
	January.	February.	Period, January and February.
	"	"	"
Burma Coast and Bay Islands	- '011	+ '014	+ '002
Burma Inland	+ '010	+ '009	+ '010
Assam	- '007	+ '003	- '002
Bengal and Orissa	- '004	- '004	- '004
Gangetic Plain and Chota Nagpur	- '006	- '009	- '008
Upper Sub-Himalayas	+ '003	- '008	- '003
Indus Valley and North-West Rajputana	+ '013	- '014	+ '002
East Rajputana, Central India and Gujarat	+ '010	- '001	+ '005
Deccan	+ '001	+ '005	+ '003
West Coast	- '003	+ '011	+ '004
South India	- '006	+ '005	- '001

II.—The hot weather period.—Weather was less disturbed and much drier than usual in March over Northern India. Three storms of the cold-weather type formed in Persia during the month, but decreased in intensity and importance as they advanced eastward and hence affected weather very slightly in Upper India. Weather in April was abnormally dry over the whole of Northern and Central India from the 1st to the 8th, and was unusually disturbed from the 9th to the 18th. North-Eastern India obtained moderate to heavy rain from the 9th to the 15th and the Peninsula from the 10th to the 18th. Both areas received light to moderate showers from the 18th to the 24th, after which dry weather with rapidly increasing temperature, set in. Drier and hotter weather than usual prevailed throughout Upper India. May was also hotter than usual except in Burma. A cyclonic storm passed into that province from the Bay on the 2nd and was followed by frequent rain during the remainder of the month.

The mean pressure of the Indian area was in moderate defect in March and May and normal in April, as is shown by the following statement:—

MONTH.	MEAN PRESSURE VARIATION.			
	WHOLE INDIA.			
	From data of Table I.	From data of Table II.	Tropical India.	Extra-Tropical India.
March	—'010	—'003	—'001	—'004
April	—'001	—'004	+ '002	—'010
May	—'019	—'019	—'012	—'025

Pressure averaged '010" in defect for the whole period.

The following table gives the corresponding temperature variation data for the whole of India:—

MONTH.	MEAN TEMPERATURE VARIATION FROM DATA OF TABLE II.		
	Whole India.	Tropical India.	Extra-tropical India.
	°	°	°
March	+1'6	+0'8	+2'5
April	—1'1	—1'5	—0'7
May	+0'8	—0'4	+2'1

Temperature was in excess in March and May by amounts approximately proportional to the deficiency in the mean pressure amounts and in defect in April.

The following gives the local pressure variations or anomalies for each month and for the whole period in each of the eleven meteorological provinces:—

METEOROLOGICAL PROVINCE.	PRESSURE ANOMALY.			
	March.	April.	May.	Period, March to May.
	"	"	"	"
Burma Coast and Bay Islands .	—'016	—'014	—'005	—'012
Burma Inland	+ '008	—'001	+ '002	+ '003
Assam	—'002	+ '010	—'025	—'006
Bengal and Orissa	—'012	+ '010	—'023	—'003
Gangetic Plain and Chota Nagpur	—'016	+ '014	—'007	—'003
Upper Sub-Himalayas	0	+ '006	—'006	0
Indus Valley and North-West Rajputana.	+ '003	—'017	—'028	—'014
East Rajputana, Central India and Gujarat.	+ '016	—'014	+ '011	+ '004
Deccan	+ '011	+ '005	+ '013	+ '010
West Coast	+ '003	—'001	+ '028	+ '010
South India	+ '001	+ '002	+ '014	+ '006

The above data show that the anomalies of the pressure distribution in India were similar in character in March and May and were generally opposite in character in April but were small in amount. Hence the mean anomalies of the period were similar to those of March and May but less in amount. The chief features indicated by the mean pressure anomalies of the period were—

(1) A slight relative deficiency of pressure in North-Eastern India and Burma and a slight excess in the Andamans. These features were most persistent in Lower Burma and the Andaman Sea.

The following gives comparative data for these areas:—

AREA.	PRESSURE ANOMALY.			
	March.	April.	May.	Period, March to May.
	"	"	"	"
Port Blair	+ '007	+ '011	+ '023	+ '014
Lower Burma	—'013	—'010	—'014	—'012
Bengal	—'014	+ '008	—'024	—'010
Assam	—'002	+ '010	—'025	—'006
Orissa	—'009	+ '012	—'022	—'006

This feature of deficient pressure in North-Eastern India, it may be noted, was strongly marked in May and it is almost certain was influential in determining the Bay current in the rains more largely than usual to Burma, Assam and East Bengal.

(2) A relative excess of pressure in North Bombay, the Konkan, Central India, Berar, the Central Provinces and the North Deccan, most persistent and marked in Berar and the western districts of the Central Provinces.

The following gives comparative data for that area:—

AREA.	PRESSURE ANOMALY.			
	March.	April.	May.	Period, March to May.
Central Provinces (West and Central).	"	"	"	"
Berar	+ '015	— '001	+ '016	+ '010
Central India	+ '025	+ '021	+ '028	+ '025
Kathiawar and Cutch	+ '016	— '004	+ '013	+ '008
Konkan	+ '025	— '013	+ '022	+ '011
Bombay Deccan	+ '004	+ '002	+ '028	+ '011
	+ '009	+ '005	+ '023	+ '012

This feature was well marked in March, but tended to disappear in April. It came into great prominence in May. As shown later, it was chiefly a product of the temperature conditions of the Indian area during the period.

A similar contrast of the local anomalies (*vis.*, the contrast between the local excess of pressure in the west and north-west of the Peninsula and the local deficiency in North-Eastern India) obtained in the hot weather periods of 1898, 1897, 1896, 1895, 1894, 1892, 1890 and 1880.

(3). A local deficiency of pressure in Sind and the Punjab. It covered a very small area and was very feebly marked in March, but increased in extent and importance with the continued hot and dry weather of April and May, and was one of the more important features of the relative distribution of pressure in May.

The following gives data in illustration:—

AREA.	PRESSURE ANOMALY.			
	March.	April.	May.	Period, March to May.
Punjab	"	"	"	"
Sind	+ '003	— '003	— '019	— '006
	+ '010	— '020	— '010	— '007

This feature, it may be noted, does not appear to have extended into Baluchistan or Persia, an illustration of an important fact that the persistent and abnormal features of the pressure conditions in the hot weather are, as a rule, restricted to India and do not affect the plateau of Central Asia or the Persian area.

(4). An interesting feature of the pressure distribution of the period was the vertical pressure anomalies. They were positive and large on the mean of the period for the hill stations in North-Western India. They were moderate to large in March, small and irregular in April and large in May.

The following gives the vertical pressure anomalies as determined from the pressure variations of nine pairs of stations in Northern and Central India:—

HILL AND PLAIN STATIONS.	VERTICAL PRESSURE ANOMALY.			
	March.	April.	May.	Period, March to May.
Quetta and Jacobabad	"	"	"	"
Leh and Lahore	+ '035	+ '032	+ '043	+ '037
Murree and Peshawar	+ '063	— '013	+ '075	+ '042
Simla and Ludhiana	+ '007	— '007	+ '058	+ '019
Ranikhet and Bareilly	+ '042	— '001	+ '047	+ '029
Chakrata and Roorkee	+ '038	— '006	+ '025	+ '019
Darjeeling and Dhubri	+ '048	— '005	+ '045	+ '029
Mount Abu and Deesa	— '012	— '033	+ '035	— '003
Pachmarhi and Seoni	+ '015	0	— '021	— '002
	+ '008	— '017	+ '003	— '002

A comparison of the vertical pressure anomalies of the period with the temperature variations will show that excess or positive values of the one accompanied positive values of the other, and that they were roughly proportional. This is shown more clearly by the following statement:—

MONTH.	Mean vertical pressure anomaly, (Murree, Simla and Ranikhet). (a).	Mean temperature variation, (North-Western Provinces and Punjab). (b).	Ratio of (a) to (b).
March	"	0	
April	+ '029	+ 2'8	'01
May	— '005	— 0'6	'01
Mean of period	+ '043	+ 3'6	'01
	+ '022	+ 1'9	'01

The following gives a fuller statement of the abnormal features of the pressure conditions of May.

The mean pressure of the Indian area in May was slightly below the normal ('019"). Pressure, was relatively to the general conditions, more or less in defect in North-Eastern India and Burma and in Upper India and was in

excess in the remainder of India. This contrast of conditions between Upper and North-Eastern India and Western India, it may be noted, almost invariably obtains in years of strongly marked hot weather conditions—more especially after milder winters than usual in the Western Himalayas. The local deficiency was most marked in Bengal and the West Punjab, and the local excess greatest in the western half of the Peninsula. The following gives data for stations in the areas of greatest excess and deficiency of pressure :—

STATION.		PRESSURE ANOMALY IN MAY.		
		1899.	1898.	1897.
		"	"	"
BENGAL AREA OF DEFICIENT PRESSURE.	Saugor Island . . .	—'040	—'013	—'010
	Chittagong . . .	—'031	—'008	+ '001
	Narayanganj . . .	—'029	—'009	—'005
	Mymensingh . . .	—'030	—'012	—'008
PUNJAB AREA OF DEFICIENT PRESSURE.	Dhubri . . .	—'033	—'017	—'004
	Peshawar . . .	—'045	—'002	+ '011
	Dera Ismail Khan . .	—'041	?	—'017
	Mooltan . . .	—'042	+ '008	—'027
WESTERN INDIA AREA OF EXCESSIVE PRESSURE.	Khandwa . . .	+ '033	+ '023	+ '021
	Ratnagiri . . .	+ '034	+ '027	+ '033
	Goa . . .	+ '040	+ '034	+ '034
	Mangalore . . .	+ '033	+ '013	+ '018
	Coimbatore . . .	+ '029	+ '005	+ '007

The pressure variations in May 1887, 1894, 1895, 1896, 1897 and 1898 were similar in general character to those of the corresponding month of the present year, the chief difference being that they were slightly more marked in the present year than in those preceding years. The large local deficiency in the West Punjab was a special feature of the year.

The position of the trough of low pressure varied very considerably during the month. At the end of the month its axis was defined by the stations of Calcutta, Hazaribagh, Allahabad, Sirsa and Dera Ismail Khan, and was hence further north than usual.

III.—The south-west monsoon period.—The south-west monsoon currents were established in the Arabian Sea slightly later than usual. They began to give heavy rain on the Konkan Coast from the 10th and 11th, and were of moderate strength until the 22nd, when they fell off considerably in strength and withdrew from the central parts of the country where they were replaced by dry westerly winds. The humid current advanced very rapidly across the north of the Peninsula, Central India

and Rajputana, and these districts received general light rain from the 12th to the 14th. In the East Punjab the rains commenced feebly on the 15th.

The Bay current was established at the head of the Bay on the 11th and 12th, and advanced rapidly up the Gangetic Plain as far as the central districts of the North-Western Provinces on the 13th and 14th. A further advance occurred into the western districts of the North-Western Provinces, North-East Rajputana and the East Punjab on the 21st. These districts received favourable rain during the remainder of the month.

The following gives the chief features of the pressure conditions during the period from July to September :—

(1) The advance of the monsoon currents in June temporarily reversed the pressure anomalies, as is usually the case, and the pressure anomalies of June were hence generally opposite in sign to those of May. The following give comparative data for the eleven meteorological provinces in illustration :—

METEOROLOGICAL PROVINCE.	Pressure anomaly.		
	May.	June.	Change, May to June.
	"	"	"
Burma Coast and Bay Islands . . .	—'005	+ '021	+ '026
Burma Inland	+ '002	+ '024	+ '022
Assam	—'025	+ '004	+ '029
Bengal and Orissa	—'023	+ '013	+ '036
Gangetic Plain and Chota Nagpur . .	—'007	— '00	0
Upper Sub-Himalayas	—'006	—'014	—'008
Indus Valley and North-West Rajputana .	—'028	—'034	—'006
East Rajputana, Central India and Gujarat	+ '011	—'014	—'025
Deccan	+ '013	—'002	—'015
West Coast	+ '028	—'004	—'032
South India	+ '014	+ '005	—'009

The Arabian Sea current was abnormally feeble during the remainder of the season and gave no general heavy rain over the area usually dependent upon it. The northern districts including Sind, East and Central Rajputana, the western states of Central India, Cutch, Kathiawar and Gujarat received practically no rain in July, August or September. The Konkan Coast districts had occasional light rain, and Berar, the Deccan and Central Provinces light showers. This current hence failed entirely as a rain-giving current in these three months.

The Bengal current was slightly stronger than usual in July and practically of normal strength in August and September. It was determined more largely than usual towards Burma and North-Eastern India, more especially to

Bihar and the North-Western Provinces in July and to Bengal, Assam and Burma in August and September. These provinces all received favourable rain. The rains ceased very considerably earlier than usual in the East Punjab and the western districts of the North-Western Provinces.

The pressure conditions accompanying these abnormal features of the monsoon were strongly marked.

(2) Pressure was in slight excess in the Indian area from June to August, and in considerable excess in September. The following gives data :—

MONTH.	MEAN VARIATION OF PRESSURE FROM NORMAL.		
	Extra-Tropical India.	Tropical India.	Whole India.
June	—'003	+ '011	+ '004
July	+ '002	+ '023	+ '013
August	+ '001	+ '006	+ '004
September	+ '037	+ '040	+ '039

(3) The pressure anomalies were very persistent from July to September, and were similar in general character to the anomalies of the month of May and closely related to the distribution of rainfall.

Pressure was throughout the period from July to September locally in defect in Northern India and Burma, the deficiency on the whole decreasing in amount in the western half of the area and increasing in the eastern half.

The following gives data in illustration :—

AREA.	PRESSURE ANOMALY.					
	June.	July.	August.	September.	Period, June to September.	Period, July to September.
	"	"	"	"	"	"
Burma	+ '022	—'040	—'033	—'016	—'017	—'030
Bengal.	+ '009	—'023	—'028	—'019	—'015	—'023
Orissa	+ '031	+ '009	—'028	+ '008	+ '005	—'004
Bihar	—'007	—'026	—'026	—'022	—'020	—'025
Chota Nagpur	+ '003	—'004	—'009	+ '010	0	—'001
North-Western Provinces and Oudh.	—'014	—'017	—'010	—'011	—'013	—'013
Punjab.	—'021	—'033	—'010	—'014	—'020	—'019

Pressure was, on the other hand, in relative excess over the remainder of the Indian land area except South India.

The excess was greatest in the area in which the drought was most severe, including Berar, Gujarat, the Central Provinces, the Bombay Deccan, Kathiawar and South-West Rajputana. The following gives data :—

AREA.	PRESSURE ANOMALY.				
	June.	July.	August.	September.	Period, June to September.
	"	"	"	"	"
Rajputana.	—'016	+ '024	+ '047	+ '023	+ '020
Central India	—'009	+ '022	+ '026	+ '023	+ '016
Central Provinces	+ '002	+ '031	+ '021	+ '033	+ '022
Berar	—'001	+ '048	+ '041	+ '041	+ '032
Gujarat	—'013	+ '046	+ '061	+ '041	+ '034
West Coast	—'004	+ '034	+ '026	+ '017	+ '018
Bombay Deccan	—'013	+ '041	+ '037	+ '022	+ '022
Madras Deccan	+ '001	+ '028	+ '019	+ '009	+ '014
Madras Coast	+ '015	+ '017	—'007	+ '003	+ '007
Mysore	—'012	+ '014	+ '007	—'007	+ '001
South India	0	+ '006	—'003	—'010	—'002

The following gives data for the period July to September for stations at which the excess was absolutely greatest :—

STATION.	PRESSURE ANOMALY.			
	July.	August.	September.	Mean of period, July to September.
	"	"	"	"
Bhuj	+ '049	+ '075	+ '049?	+ '058
Deesa	+ '042	+ '062	+ '043	+ '049
Rajkot	+ '046	+ '060	+ '044	+ '050
Indore	+ '050	+ '053	+ '046	+ '050
Khandwa	+ '048	+ '050	+ '050	+ '049
Amraoti	+ '050	+ '040	+ '042	+ '044
Akola	+ '046	+ '041	+ '039	+ '042
Malegaon	+ '041	+ '042?	+ '032	+ '038
Surat	+ '044	+ '048	+ '037	+ '043

(4) The vertical pressure anomalies were throughout the period positive in Northern India and were on the average of the whole period moderate in amount. It is noteworthy that although the anomalies were positive in the

drought area in Berar they were negative in the drought area in the Central Provinces and Rajputana as shown by the data for Mount Abu and Deesa, and Pachmarhi and Hoshangabad. Probably the data for Chikalda and Buldana are not correct. The following gives data for ten pairs of stations :—

PAIR OF STATIONS.	VERTICAL PRESSURE ANOMALY.				
	June.	July.	August.	September.	Period, June to September
Leh and Lahore .	+ '016	+ '031	+ '033	+ '018	+ '025
Murree and Peshawar	+ '014	+ '012	+ '006	— '001	+ '003
Quetta and Jacobabad	+ '027	+ '047	+ '013	+ '010	+ '024
Simla and Ludhiana	+ '005	+ '029	+ '031	+ '022	+ '022
Darjeeling and Dhubri	+ '002	+ '041	+ '055	+ '006	+ '026
Ranikhet and Bareilly	+ '010	+ '006	+ '023	+ '020	+ '015
Chakrata and Roorkee	+ '014	+ '028	+ '029	+ '024	+ '024
Mount Abu and Deesa	— '016	— '033	— '012	— '039	— '025
Pachmarhi and Hoshangabad.	— '007?	— '023 ?	— '019 ?	?	?
Chikalda and Buldana	+ '007	— '002	+ '003	+ '007	+ '004

IV.—The retreating south-west monsoon.—The south-west monsoon currents in the Bay withdrew earlier than usual from the Bay area. In the first week of October weather was showery in Burma and Southern India and fine and dry elsewhere. There were two periods of stormy weather in the Bay. The first disturbance developed into a cyclonic storm of moderate intensity and advanced northwards into Orissa and Bengal to which it gave a heavy downpour of rain from the 14th to the 16th. The Madras Coast districts received frequent moderate rain from the 19th to the 31st. The second disturbance of the month in the Bay was diffused in character. It gave a moderate burst of rain to Bengal, Orissa and Assam from the 27th to the 29th.

A disturbance in the Bay in the second week of November gave moderate to heavy rain in Southern India from the 12th to 14th. With this exception the month was unusually dry in the Peninsula. Several shallow depressions advanced into Upper India from Baluchistan. They gave cloud and light rain or snow in the Upper India Hills.

A feeble disturbance gave rain to Ceylon and the coast-districts of Southern India from the 10th to the 13th or 14th December. This was the last rainfall received from the retreating south-west monsoon in Southern India.

Several depressions advanced from Persia and Baluchistan into Upper India in December. They were all of little importance except the last of the series. This

formed over the Persian Gulf on the 27th, passed through Baluchistan on the 28th and across Upper India on the 29th and 30th.

It gave some rain in the Punjab Plains and a moderately heavy fall of snow in the Punjab and Kashmir Himalayas.

The chief feature of the period was the scanty rainfall over the greater part of the Peninsula. This accompanied in October a determination of the storms and rainfall to Bengal, and in November the early withdrawal of the monsoon currents to the extreme south and south-east of the Bay.

The following table gives the pressure anomalies in the eleven meteorological provinces for each month of the period and for the whole period :—

METEOROLOGICAL PROVINCE.	PRESSURE ANOMALY.			
	October.	November	December.	Period, October to December.
Burma Coast and Bay Islands .	+ '010	+ '017	+ '008	+ '012
Burma Inland	+ '017	— '019	+ '012	+ '003
Assam	+ '019	+ '006	— '003	+ '007
Bengal and Orissa	+ '015	+ '008	0	+ '008
Gangetic Plain and Chota Nagpur.	+ '005	— '014	— '018	— '009
Upper Sub-Himalayas	0	— '024	— '020	— '015
Indus Valley and North-West Rajputana.	+ '001	— '029	— '028	— '019
East Rajputana, Central India and Gujarat.	— '016	— '018	— '010	— '015
Deccan	— '003	— '001	+ '009	+ '002
West Coast	— '016	+ '032	+ '019	+ '012
South India	— '011	+ '031	+ '025	+ '015

The following gives the chief abnormal features of the period :—

(1) Pressure was in moderate excess over the whole Indian area in October and November and normal in amount in December. An important feature was an excess of about '02" in Tropical India, relative to Extra-Tropical India. The following gives data :—

AREA.	MEAN VARIATION OF PRESSURE FROM NORMAL.			
	October.	November.	December.	Period, October to December.
Extra-Tropical India .	+ '032	+ '011	— '013	+ '010
Tropical India	+ '025	+ '032	+ '010	+ '022
Whole India	+ '029	+ '022	— '002	+ '016

(2) Pressure was, as stated above, in local excess in the Bay, the Andaman Sea, Burma, Bengal and Assam on the mean of the period from October to December. This feature is shown by the data of the districts given below:—

AREA.	PRESSURE ANOMALY.			
	October.	November.	December.	Period, October to December.
	"	"	"	"
Port Blair	+ '007	+ '017	+ '022	+ '015
Lower Burma	+ '014	+ '018	+ '007	+ '013
Bengal	+ '016	+ '007	— '001	+ '007
Assam	+ '019	+ '006	— '003	+ '007
Orissa	+ '013	+ '012	— '001	+ '008
Chota Nagpur	+ '014	+ '002	— '001	+ '005

The local excess in that area was slight in amount, but was persistent and was evidently directly related to the early withdrawal of the monsoon current from the Bay.

(3) Pressure was in local excess in the Peninsula, the Central Provinces and Berar during the months of November and December. It was, on the other hand, in relative defect over the greater part of that area in October, in which month the east and south of the Peninsula obtained fair rain from the retreating monsoon. These features are indicated by the following comparative data:—

AREA.	PRESSURE ANOMALY.			
	October.	November.	December.	Period, October to December.
	"	"	"	"
Central Provinces . .	+ '004	— '005	+ '007	+ '002
Berar	+ '005	+ '003	+ '014	+ '007
West Coast	— '016	+ '032	+ '019	+ '012
Bombay Deccan . . .	— '016	+ '010	+ '017	+ '004
Madras Coast	— '002	+ '038	+ '030	+ '022
Madras Deccan . . .	— '010	+ '013	+ '010	+ '004
South India	— '018	+ '039	+ '032	+ '018

(4) Pressure was in slight to moderate relative defect throughout the period in North-Western and Central India. The deficiency increased steadily in amount from October to December and was considerable in Upper India in December.

AREA.	PRESSURE ANOMALY.			
	October.	November.	December.	Period, October to December.
	"	"	"	"
Punjab	— '003	— '029	— '021	— '018
Sind	+ '009	— '019	— '031	— '014
Rajputana	+ '016	— '022	— '013	— '017
Central India	— '010	— '022	— '006	— '013
North-Western Provinces and Oudh.	0	— '025	— '023	— '016
Bihar	+ '006	— '008	— '008	— '003

(5) A noteworthy feature of the period was the slight to considerable excess of pressure in the Persian area, and South Arabia which was apparently related to conditions in Southern Europe and Asia Minor and not to conditions in India:—

STATION.	VARIATION OF PRESSURE FROM NORMAL.			
	October.	November.	December.	Period, October to December.
	"	"	"	"
Baghdad	+ '060	+ '012	+ '041	+ '038
Bushire	+ '035	+ '017	+ '012	+ '021
Aden	+ '030	+ '014	— '014	+ '013

(6) The vertical pressure anomalies were generally positive and small to moderate in amount throughout the period. They were hence of considerable importance, indicating the probability of deficient winter rainfall in North-Western India. The following gives the vertical pressure anomalies as determined from the pressure variations of eight pairs of stations:—

PAIRS OF STATIONS.	VERTICAL PRESSURE ANOMALY.			
	October.	November.	December.	Period, October to December.
	"	"	"	"
Quetta and Jacobabad .	— '005	+ '020	+ '030	+ '015
Murree and Peshawar .	+ '027	+ '048	+ '042	+ '039
Simla and Ludhiana . .	+ '015	+ '029	+ '014	+ '019
Ranikhet and Bareilly .	+ '018	+ '023	+ '020	+ '020
Darjeeling and Dhubri .	+ '001	+ '014	+ '013	+ '009
Mount Abu and Deesa . .	— '009	— '008	+ '018	0
Leh and Lahore	+ '013	+ '021	+ '009	+ '014
Chakrata and Roorkee .	+ '029	+ '032	+ '024	+ '028

The year.—The mean pressure of the year was '004" above the normal. Pressure was lower than the mean of the year in the Punjab, the North-Western Provinces, Bihar, Bengal and Assam and normal in Burma. The

following gives mean variation data of the year for these areas :—

PROVINCE OR AREA.	Variation from normal of mean 8 A.M. pressure of year.	Pressure anomaly of year.
Upper Sind	"	"
Punjab	—'010	—'014
North-Western Provinces and Oudh	—'008	—'012
Bihar	—'005	—'009
Bengal	—'006	—'010
Assam	—'004	—'008
Lower Burma	—'002	—'006
	0	—'004

Pressure was above the normal of the year in the remainder of India, as shown below :—

PROVINCE OR AREA.	Variation from normal of mean 8 A.M. pressure of year.	Pressure anomaly of year.
Baluchistan	"	"
Lower Sind	+ '018	+ '014
Rajputana	+ '012	+ '008
Central India	+ '009	+ '005
Gujarat	+ '009	+ '005
Berar	+ '011	+ '007
Central Provinces	+ '026	+ '022
Chota Nagpur	+ '016	+ '012
Orissa	+ '005	+ '001
Bombay Deccan	+ '008	+ '004
Madras Deccan	+ '015	+ '011
West Coast	+ '010	+ '006
Madras Coast	+ '016	+ '012
South India	+ '014	+ '010
	+ '008	+ '004

The excess was more than '02" in three areas for which data are given below :—

AREA.	STATION.	Variation from normal of mean 8 A.M. pressure of year	Pressure anomaly, of year.
BERAR AND THE CENTRAL PROVINCES.	Amraoti	"	"
	Khandwa	+ '029	+ '025
	Indore	+ '028	+ '024
	Akola	+ '025	+ '021
	Saugor	+ '023	+ '019
		+ '021	+ '017

AREA.	STATION.	Variation from normal of mean 8 A.M. pressure of year	Pressure anomaly, of year.
KONKAN	Goa	"	"
	Ratnagiri	+ '026	+ '022
	Bombay	+ '023	+ '019
CIRCARS	Cocanada	+ '021	+ '017
		+ '024	+ '020

The chief features of the pressure conditions of the year were the contrast between the increased pressure in the Peninsula and Central India and the decreased pressure in Northern India and the contrast between the deficient pressure in the dry season and the increased pressure in the wet season. Data for the latter are given below :—

AREA.	VARIATION FROM NORMAL OF MEAN PRESSURE.	
	January to May.	June to December.
Tropical India	"	"
Extra-Tropical India	—'009	+ '021
Whole India	—'015	+ '010
	—'013	+ '016

The following gives the variations of the mean pressure of Extra-Tropical and Tropical India and also of the whole of India from the normal, month by month, during the year 1899, for convenient reference :—

MONTH.	VARIATION FROM NORMAL OF MEAN PRESSURE IN		
	Extra-Tropical India from Table II.	Tropical India from Table II.	Whole India from Table II.
January	"	"	"
February	+ '002	—'005	—'002
March	—'038	—'031	—'035
April	—'004	—'001	—'003
May	—'010	+ '002	—'004
June	—'025	—'012	—'019
July	—'003	+ '011	+ '004
August	+ '002	+ '023	+ '013
September	+ '001	+ '006	+ '004
October	+ '037	+ '040	+ '039
November	+ '032	+ '025	+ '029
December	+ '011	+ '032	+ '022
WHOLE YEAR	—'013	+ '010	—'002
	—'001	+ '008	+ '004

The following gives the progressive variation of the mean annual pressure of the past 25 years for the Indian land area :—

YEAR.	Number of stations.	Mean anomaly.	Progressive variation.
		"	"
1875	33	—'007	
1876	35	—'007	0
1877	59	+ '032	+ '039
1878	65	+ '002	—'030
1879	81	—'014	—'016
1880	93	—'003	+ '011
1881	93	+ '002	+ '005
1882	93	—'010	—'012
1883	105	—'005	+ '005
1884	107	+ '010	+ '015
1885	113	+ '014	+ '004
1886	118	—'003	—'017
1887	117	—'006	—'003
1888	109	+ '011	+ '017
1889	76	+ '004	—'007
1890	77	—'009	—'013
1891	72	+ '010	+ '019
1892	72	—'022	—'012
1893	66	—'001	+ '021
1894	66	—'012	—'011
1895	66	+ '003	+ '015
1896	68	—'001	—'004
1897	74	—'005	—'004
1898	74	—'018	—'013
1899	51	+ '004	+ '022

The following gives a statement of the cyclones and more important cyclonic storms which affected the Indian area during the south-west monsoon of 1899, drawn up in the form adopted in the annual reports of the meteorology of India for the year 1886—1890 :—

No.	Month.	Date.	Greatest observed barometric depression.	Character of storm.	Details of storm.
1	April .	28th April to 2nd May.	'37"	Cyclonic storm of considerable intensity.	This storm was generated in the Andaman Sea in front of the first temporary advance of humid south-west winds over the south-east of the

No.	Month.	Date.	Greatest observed barometric depression.	Character of storm.	Details of storm.
					Bay. It marched slowly northwards towards the Burma Coast, the centre passing over Diamond Island on the 1st. It continued to advance very slowly on the 2nd, and broke up as a distinct cyclonic circulation against the South Arakan Hills before the morning of the 3rd. Apparently it was a concentrated disturbance of considerable intensity and occasioned a moderate to heavy burst of rain over Burma. The strongest winds experienced in the storm area were of force 9 by the <i>S. S. Shahsada</i> .
2	August.	7th to 13th.	'27"	Cyclonic storm of moderate intensity.	This storm was formed between the Andamans and the Burma Coast on the 7th. It drifted along a west by north track across the Bay and passed inland across the Orissa Coast about noon on the 10th. It thence marched through the Central Provinces on the 11th into the eastern states of Central India on the 12th, where it filled up during the succeeding 24 hours. It was a storm of moderate intensity and the strongest winds experienced during its existence over the Bay did not exceed 9 in force.
3	August.	26th to 31st.	'15"	Cyclonic storm of feeble intensity.	This storm originated in the north of the Bay of Bengal on the 26th and advancing along the usual track of cyclonic storms in August passed into Orissa on the morning of the 28th. It then recurved and marching north-eastwards passed into Bihar on the 30th, where it broke up slowly during the next 36 hours. This disturbance was throughout its existence feeble and of little importance.
4	September.	8th to 16th	'06"	Cyclonic storm of feeble intensity.	This storm formed off the coast of Arakan on the 8th. It drifted along a westerly track during the next three days, developing at the same time, and crossed the Ganjam Coast between Gopalpur and Vizagapatam on the morning of the 12th. It passed through the Central Provinces on the 13th into the central districts of the North-Western Provinces on the 14th. It then recurved rapidly to east and advanced into Bihar where it filled up on the 17th. It was a feeble disturbance, the strongest winds in the Bay during its existence being only of force 7. It however gave a much-needed burst of rain to the districts affected by it.

No.	Month.	Date.	Greatest observed barometric depression.	Character of storm.	Details of storm.	No.	Month.	Date.	Greatest observed barometric depression.	Character of storm.	Details of storm.
5	Septem-ber.	19th to 25th.	27"	Cyclonic storm of moderate intensity.	This storm was generated in the north of the Bay nearly midway between the Arakan and Ganjam Coasts on the 19th and 20th. It travelled northwards passing inland across the Sunderbans near Saugor Island on the morning of the 23rd. It continued to drift in the same direction during the next 48 hours and broke up before the morning of the 25th in the Sikkim Himalayas to which it gave an exceptionally heavy burst of rain.						The storm formed much further south and west than is ordinarily the case in October and was noteworthy for the heavy burst of rain which accompanied it, more especially in Orissa. The vessels within the storm area in the Bay experienced winds of force 8 to 9.
6	October.	12th to 16th.	0.17"	Feeble Storm.	The strongest winds in the Bay during its existence were of force 8. This storm formed in the south-west of the Bay off the South Madras Coast on the 11th and 12th. It intensified slowly and marching northwards parallel to the coast on the 13th and 14th passed inland across the Bengal coast during the 15th. It thence passed into East Bengal on the 16th at 8 A.M. of which day it was central a little to the west of Narayan-ganj. It broke up rapidly during the day.						

The following is a similar statement of the only important land-formed depression generated in the plains of Bengal during the south-west monsoon of 1899 :—

No.	Month.	Date.	Greatest observed barometric depression.	Character of storm.	Details of storm.
1	July.	12th to 15th.	23"	Land-formed depression of moderate intensity.	This land-formed depression was generated in Deltaic Bengal on the 13th. It drifted very slowly north-westwards during the next two days into the central districts of Bengal and Chota Nagpur where it filled up during the day. It occasioned general moderate to heavy rain over North-Eastern India.

Winds.

The mean direction of the wind and the mean diurnal movement of the air, as measured by Robinson anemometers, are given for all second class stations in Table II in each monthly review. The normal values are also stated for the sake of ready comparison. The normal data of these elements, utilized in Table II of the monthly weather reviews of the year 1899, will be found in a collected form in Tables XI and XII of the Annual Summary for 1896 (pages 638—644). The mean 8 A.M. wind directions for each month are laid down in the first chart in each monthly review. They are calculated in the usual manner by Lambert's formula from the 8 A.M. wind data given in Table I in each monthly review. As a general rule, the mean 8 A.M. wind directions vary little from the mean wind directions (calculated from the 10 and 16 hours wind data) in Table II of each monthly review, but in some cases and at certain seasons of the year they differ very considerably.

The chief features of the air movement over India in 1899, have been described in the monthly reviews of the year. The following gives a summary of the most important features for each period :—

I. The cold weather period.—This period was less disturbed than usual in Northern India in January. There were several cold weather storms in February but they

were feeble and the accompanying air movement was hence considerably less than usual in these storms.

The winds at the hill stations in Northern India were generally considerably above their normal strength in January, but varied irregularly from the normal in February, though on the mean of the month they were practically of about normal intensity—an illustration of the fact that the steady winds of finer weather than usual in this season are stronger than the unsteady winds in periods of more disturbed weather than usual. The following gives data in illustration :—

STATION.	MEAN DAILY AIR MOVEMENT IN MILES.					
	Actual, January.	Normal, January.	Percentage variation from normal, January.	Actual, February.	Normal, February.	Percentage variation from normal, February.
Chakrata . .	201	123	+63	232	134	+73
Ranikhet . .	72	44	+64	81	57	+42
Darjeeling . .	?	88	?	121	137	—12
Mount Abu . .	136	119	+14	152	140	+9
Pachmarhi . .	82	78	+5	85	98	—13
Chikalda . .	152	123	+24	189	148	+28

Winds were on the mean of the month somewhat stronger than usual in January and below their normal strength in February in the plains of Northern India and were on the mean of the period generally slightly below their normal strength, as is shown by the following data:—

AREA.	MEAN WIND STEADINESS DURING COLD WEATHER PERIOD, JANUARY AND FEBRUARY.			MEAN DAILY AIR MOVEMENT IN MILES DURING COLD WEATHER PERIOD, JANUARY AND FEBRUARY.		
	Actual percent-age.	Normal percent-age.	Variation from normal.	Actual.	Normal.	Percent-age variation from normal.
Bengal . . .	40	30	+ 10	123	114	+ 8
Bihar . . .	45	47	— 2	66	77	— 14
Chota Nagpur .	50	52	— 2	168	154	+ 9
North-Western Provinces.	40	31	+ 9	77	62	+ 24
Punjab . . .	36	22	+ 14	49	54	— 9
Rajputana . .	43	30	+ 13	102	149	— 32

The chief feature of the air movement in February was the frequent occurrence of southerly winds on the Bengal coast, due to the passage eastwards of cold weather storms across Bengal, rather than to the establishment of normal hot weather conditions.

Winds were very irregular in direction on the mean of the period in Berar, Central India and the Central Provinces, although they were practically of normal steadiness. The following gives data of steadiness in illustration:—

AREA.	PERCENTAGE OF MEAN WIND STEADINESS.			
	January.	February.	Mean of period, January and February.	Variation from normal of period, January and February.
Berar	32	21	27	+ 4
Central Provinces . .	29	25	27	0

The air movement in Bombay, the Madras coast, and Mysore was practically normal in January and slightly stronger than usual in February. It was, on the other hand, somewhat stronger in both months in the Deccan.

The following gives comparative data showing the variations of the intensity of amount of the diurnal air

movement from the normal in the Peninsula during this period:—

AREA.	MEAN DAILY AIR MOVEMENT IN MILES.				
	Actual, January.	Actual, February.	Mean actual of period, January and February.	Mean normal of period, January and February.	Percent-age variation from normal of period, January and February.
Central Provinces .	91	104	98	96	+ 2
Berar	120	140	130	117	+ 11
Deccan	155	174	165	149	+ 11
Madras Coast . .	159	147	153	153	0
Mysore	143	131	137	142	— 4
Konkan	168	165	167	163	+ 2

The following gives a statement of the mean wind force and its variation from the normal in the Bay of Bengal and Arabian Sea:—

AREA.	MEAN DAILY FORCE OF WIND (BEAUFORT'S NOTATION).					
	Actual, January.	Variation from normal, January.	Actual, February.	Variation from normal, February.	Mean actual of period, January and February.	Variation from normal of period, January and February.
Bay of Bengal . .	3'3	+0'3	2'6	+0'1	3'0	+0'2
Arabian Sea . . .	3'8	+0'5	3'0	0	3'4	+0'3

II. The hot weather period.—Weather was on the whole less disturbed than usual in March and May in the Indian area, but was unusually disturbed in North-Eastern India and the Peninsula in April.

The hot weather conditions were throughout more strongly marked than usual during the period in the Punjab, Sind and Rajputana. Temperature was on the mean of the month of May considerably to largely in excess in the Punjab, Upper Sind and Rajputana. The chief features of the air movement of the period in Northern and Central India were:—

1st.—Winds were slightly steadier and much more westerly than usual (more especially in March and May) in the interior of Bengal, and, as usual under those conditions, less westerly at the coast stations. They were somewhat stronger than usual in March and of normal

strength in April and May. The following gives data showing the actual deflection :—

STATION.	WESTERLY DEFLECTION.			
	March.	April.	May.	Mean of period, March to May.
Chittagong	°	°	°	°
Calcutta	+ 2	- 5	+ 4	0
Saugor Island	+22	+25	+ 7	+18
False Point	-11	- 9	-14	-11
False Point	-36	-16	- 6	-19

2nd.—Winds were stronger than usual in the North-Western Provinces throughout the period, more especially in March and May. They were on the mean of the period also somewhat steadier than usual.

3rd.—Winds were on the mean of the period somewhat feebler but less variable than usual in Chota Nagpur and the Punjab. In Bihar they were not only light but also very variable.

4th.—Winds were also, on the whole, somewhat feebler and more westerly than usual in Rajputana.

5th.—Winds from northerly directions were much more frequent than usual in May at the hill stations in Northern India.

The following gives data showing the percentage variation of the air movement, month by month, from the normal during this period in Northern and Central India :—

AREA.	PERCENTAGE VARIATION FROM NORMAL OF MEAN DAILY AIR MOVEMENT IN		
	March.	April.	May.
Bengal	+20	- 1°	- 6
Bihar	-12	-30	-30
Chota Nagpur	+15	-13	-15
North-Western Provinces	+39	+25	+35
Punjab	- 4	-13	+ 4
Rajputana	-22	-35	-17

The preceding data indicate that the air movement over the greater part of Northern India during the whole hot weather period was less vigorous than usual. The most important variation of the direction of the air movement was in the interior of Bengal where the westerly element in the winds was abnormally strong.

The following gives the chief features of the air movement in the Peninsula :—

1st.—Winds were of normal strength in Berar and the Central Provinces. They were, on the whole, somewhat more northerly than usual in March and more westerly in April and May. They were abnormally unsteady in March.

2nd.—Winds were slightly stronger than usual in the Bombay and Madras, Deccan, Berar and Mysore.

3rd.—Winds were throughout the period practically normal in strength and direction in the Madras and Bombay coast districts.

The following gives data showing the percentage variation of the air movement from the normal, month by month, in the Peninsula :—

AREA.	PERCENTAGE VARIATION FROM NORMAL OF MEAN DAILY AIR MOVEMENT IN		
	March.	April.	May.
Berar	- 2	+12	+11
Central Provinces	- 9	+15	- 3
Bombay Deccan	+ 2	+ 9	+20
Madras Deccan	+13	+24	+26
Mysore	+16	+ 6	- 3
West Coast	- 8	-10	-10
Madras Coast	-11	-11	- 9

The following gives mean data for the winds in the Bay of Bengal and Arabian Sea for the period :—

AREA.	VARIATION OF MEAN DAILY FORCE OF WIND (BEAUFORT'S NOTATION) IN			
	March.	April.	May.	Period, March to May.
Bay of Bengal.	0	0	+0.7	+0.2
Arabian Sea	-0.2	0	-0.4	-0.2

III.—The south-west monsoon period.—The Arabian Sea current was slightly delayed and was not established on the Malabar coast until the 5th and the Konkan coast until the 11th of June. It advanced with great rapidity into the interior and gave general rain to the west of the Central Provinces and Central India on the 12th and to the South-East Punjab on the 13th. The advance of the current over the Arabian Sea was made somewhat more quickly than usual. The weather was very squally in front of the advancing current, but this irregular disturbance did not develop, as is usually the case, into a cyclonic storm. The south-west monsoon current was established in the Bay during the second week of June.

The first burst of the Bombay monsoon current was not so strong as usual and the current began to decrease in strength from the 22nd. It was unusually feeble during the remainder of the period and gave occasional showers but no general heavy rain. The Bay current was strong in July and fell below its normal strength in August and September. It was determined more largely than usual towards Burma and North-Eastern India.

The comparative data in the table below based upon the anemometric observations of four coast and four inland stations under the influence of the two currents give an approximate estimate of the strength of the air movement of the two branches of the monsoon currents :—

MONTH.	PERCENTAGE VARIATION FROM NORMAL OF MEAN DAILY AIR MOVEMENT.			
	BAY OF BENGAL CURRENT.		BOMBAY CURRENT.	
	Four coast stations.	Four inland stations.	Four coast stations.	Four inland stations.
June	-1	+ 9	-12	+ 1
July	+1	-22	- 7	+18
August	-2	- 9	-20	+19
September	-3	- 8	-12	+10
MEAN OF PERIOD	-1	- 8	-13	+12

The data of the preceding table indicate that the Bay current as measured by the air movement at selected coast and inland stations was very slightly weaker than usual. The Arabian Sea current as gauged by the wind data of the Sind, Konkan and Malabar coast stations was considerably below its normal strength.

The following table gives corresponding data for the steadiness of the two currents in the coast districts of India :—

MONTH.	VARIATION FROM NORMAL OF PERCENT- AGE OF MEAN WIND STEADINESS.			
	BAY OF BENGAL CURRENT.		BOMBAY CURRENT.	
	Four coast stations.	One in- land station.	Three coast stations.	Four in- land stations.
June	+13	+20	+7	+ 5
July	+14	-14	+5	+12
August	+ 2	-14	+1	+11
September	+10	- 4	+3	+12
Mean of period	+10	- 3	+4	+10

The winds on the Sind and Konkan coasts were, as shown by the data, considerably steadier than usual.

The comparative data given in the following table of the mean actual and normal force of the winds derived from the meteorological information contained in the logs of vessels navigating the Indian seas indicate that the air movement was below the normal to a moderate extent throughout the period in the Arabian Sea, and was normal in the Bay of Bengal on the mean of the whole period. The actual variations are chiefly derived from vessels following four or five tracks in these seas, and hence do not necessarily indicate a variation common to the whole area. They, however, almost certainly establish that the current in the Arabian Sea was slightly below its normal strength throughout the period :—

MONTH.	MEAN DAILY FORCE OF WIND (BEAUFORT'S NOTATION) IN THE					
	BAY OF BENGAL.			ARABIAN SEA.		
	Actual.	Normal.	Vari- ation from normal.	Actual.	Normal.	Vari- ation from normal.
June	4'0	4'0	0	4'1	4'5	-0'4
July	4'1	4'0	+0'1	4'3	4'6	-0'3
August	4'0	4'0	0	3'6	4'3	-0'7
September	3'5	3'7	-0'2	3'0	3'5	-0'5
Mean of period	3'9	3'9	0	3'8	4'2	-0'5

The following gives a summary of the more important features of the mean air movement from the normal during the month of June :—

- Winds were more westerly than usual at Port Blair, but were less westerly than the normal in Lower Burma.
- Winds were above their normal strength in Bengal and lighter than usual in Orissa. They were, however, approximately normal in direction.
- Winds contained a strong westerly component in the Gangetic Plain and were both stronger and steadier than usual.
- Winds were more directly from the south than usual on the West Coast.
- Winds were nearly westerly in direction in the Deccan and steadier than usual.

The most noteworthy features of the period July to September were :—

- Winds were more westerly than usual at Port

Blair and in Burma and North-Eastern India. Data in illustration are given for seven stations :—

STATION.	INCREASED WESTING.			
	July.	August.	September.	Mean of period, July to September.
Port Blair	° + 21	° + 19	° + 18	° + 19
Rangoon	+ 18	+ 6	+ 3	+ 9
Diamond Island	+ 9	+ 5	+ 9	+ 8
Chittagong	+ 24	+ 11	+ 4	+ 13
Calcutta	+ 41	+ 5	+ 57	+ 34
Darbhanga	+ 13	+ 15	+ 21	+ 16
Allahabad	+ 153	+ 56	+ 54	+ 89

(2) Winds were stronger than usual in the Andamans, Bengal and Chota Nagpur, and below their normal strength in Burma and Bihar throughout the period, as shown below :—

AREA.	PERCENTAGE VARIATION FROM NORMAL OF MEAN DAILY AIR MOVEMENT IN			
	July	August.	September.	Mean of period, July to September
Port Blair	+41	+32	+11	+28
Burma	- 2	- 8	- 6	- 5
Bengal	+13	+ 5	0	+ 6
Bihar	-58	-56	-51	-55
Chota Nagpur	+16	+ 4	+ 2	+ 7

(3) Winds were above their normal intensity over the whole area dominated by the Bombay current except locally in Hyderabad and the Bombay coast districts :—

AREA.	PERCENTAGE VARIATION FROM NORMAL OF MEAN DAILY AIR MOVEMENT IN			
	July.	August.	September.	Mean of period, July to September.
Punjab	+ 9	- 2	+ 5	+ 4
Rajputana	+47	+43	+27	+39
Central Provinces	+17	+15	+ 3	+12
Berar	+33	+52	+17	+34
Hyderabad Deccan	- 3	-20	-34	-22
Bombay Deccan	+12	+ 2	+ 1	+ 5
Bombay Coast	- 9	-27	-11	-16

(4) Winds were more northerly than usual over the greater part of that area as shown below :—

STATION.	NORTHERLY DEFLECTION.		
	July.	August.	September.
Kurrachee	° + 4	° + 5	° + 8
Deesa	+ 19	+ 19	+ 17
Nagpur	+ 18	+ 17	+ 28
Bombay	+ 4	+ 1	+ 28

This increased northing of the winds was directly due to the abnormal features of the pressure conditions, the chief of which were increased pressure, greatest in the area of greatest drought (Rajputana, Gujarat, Kathiawar and Berar), and decreased pressure in North-Eastern India.

(5) The winds at the hill stations in Central India were more largely above their normal strength than in the neighbouring plains :—

STATION.	PERCENTAGE VARIATION FROM NORMAL OF MEAN DAILY AIR MOVEMENT IN		
	July.	August.	September.
Mount Abu	+68	+37	+20
Pachmarhi	+39	0	-23
Chikalda	+30	+29	+ 7

The following table gives the percentage variation of the strength of the winds from the normal, month by month, in different provinces :—

AREA.	PERCENTAGE VARIATION FROM NORMAL OF MEAN DAILY AIR MOVEMENT IN				
	June.	July.	August.	September.	Mean of period, June to September.
Burma	-12	- 2	- 8	- 6	- 7
Bengal	+20	+13	+ 5	0	+10
Bihar	-31	-58	-56	-51	-49
Chota Nagpur	-19	+16	+ 4	+ 2	+ 1
North-Western Provinces.	+ 7	+18	+31	+27	+21
Punjab	- 3	+ 9	- 2	+ 5	+ 2
Rajputana	-17	+47	+43	+27	+25
Central Provinces	+ 7	+17	+15	+ 3	+11
Berar	+ 1	+33	+52	+17	+26
Bombay Deccan	- 1	+12	+ 2	+ 1	+ 4
Madras „	+14	+27	+26	+ 5	+18

III. The retreating south-west monsoon period.—The monsoon current in the Arabian Sea was, as already pointed out, feebler than usual, and withdrew not only from North Western and Western India but also from the Arabian Sea unusually early. Abnormally dry north-west winds obtained over the whole area north of Lat. 20° N at the commencement of the month of October. North-Eastern India received its last general burst of rain in the last week of September.

The pressure conditions were somewhat abnormal in October. Pressure was generally in excess, the excess being most marked in North-Eastern India, Sind and Rajputana. In the first three weeks of the month pressure was generally very uniform with a marked tendency to the axis of the lowest pressure in North-Eastern India and the Bay to lie north and south instead of east and west. Two cyclonic disturbances formed in the Bay during this period. Their tracks were between north and north-east instead of west-north-westerly, on the whole the more usual direction. The low pressure area shifted south on the last ten days of the month and stretched across the south of the Bay. It thus occupied a position which, as a rule, it does not take until the middle or end of November.

Pressure in November was in considerable to large excess in the southern half of the Peninsula and normal or in slight defect in Upper India and perhaps in Upper Burma. Gradients were hence on the whole somewhat feebler than usual. The air movement in the Indian Seas was normal on the mean of the month. It was feebler than usual, on the whole, in Extra Tropical India, and was stronger than usual in the Peninsula. Similar pressure conditions obtained in December. Pressure was in slight defect in North-Western India and in slight to moderate excess in Southern India and the south of the Bay. The air movement was about normal in the Indian Seas. In Northern India it was feebler than usual and in the Peninsula above the normal, probably as a result of the increased heat and dryness of the interior giving rise to stronger day winds than usual.

The following gives the chief features of the direction and strength of the air movement during the period in different parts of India:—

(1) Winds were more northerly and less easterly than usual, and were also feebler than usual at Port Blair in November and December. The air movement in Burma was similar in character to that in the Andamans, the only difference being that there was more eastering in the direction of the winds than usual in the month of November.

(2) Winds were steadier but feebler than usual in West Bengal and contained a more pronounced westerly element than usual at most stations in that area. They were very light and unsteady at Saugor Island and False Point. The following gives data showing the amount of the westerly deflection at three stations:—

STATION.	WESTERLY DEFLECTION.			
	October.	November.	December.	Mean of period, October to December.
Chittagong	+ 4	— 18	— 23	— 12
Calcutta	— 19	+ 5	+ 1	— 4
Saugor Island	+ 22	+ 39	+ 42	+ 34

(3) The air movement in the Gangetic Plain and Chota Nagpur was normal in direction and intensity but very steady.

(4) Winds were feeble and unsteady in the Punjab, Central India, Rajputana and Sind.

(5) Winds were more southerly and less easterly in the Central Provinces and the Deccan in November and December and more easterly than usual in October. They were considerably steadier than usual in the latter area. The following gives data for five representative stations:—

STATION.	VARIATION FROM NORMAL OF PERCENTAGE OF WIND STEADINESS.			
	October.	November.	December.	Mean of period, October to December.
Nagpur	+ 3	— 30	— 11	— 13
Hyderabad (Deccan)	+ 25	— 7	— 13	+ 2
Bellary	+ 31	+ 4	+ 23	+ 19
Sholapur	+ 29	+ 9	+ 10	+ 16
Madras	+ 9	— 1	+ 10	+ 6

(6) Winds were stronger and steadier than usual at the Coromandal coast stations and in Southern India.

(7) The air movement varied irregularly from the normal during the period over Northern and Central India but was on the mean of the period practically normal or below it very slightly. The following gives data in illustration:—

DIVISION.	PERCENTAGE VARIATION FROM NORMAL OF MEAN DAILY AIR MOVEMENT IN			
	October.	November.	December.	Mean of period, October to December.
Bengal	+ 13	— 7	+ 3	+ 3
Bihar	— 6	— 12	— 16	— 11
Chota Nagpur	— 1	+ 6	+ 66	+ 24
North-Western Provinces	— 18	— 17	+ 38	+ 1
Punjab	+ 5	+ 20	— 15	+ 3
Sind	— 18	— 21	— 23	— 31
Rajputana	+ 18	+ 3	+ 2	+ 8

(8) The air movement was slightly stronger than usual and very irregular and unsteady in direction in the area of greatest excess of temperature including Berar and the Central Provinces. The following gives data for stations in that area :—

STATION.	MEAN DAILY AIR MOVEMENT IN					
	OCTOBER.		NOVEMBER.		DECEMBER.	
	Actual.	Variation from normal.	Actual.	Variation from normal.	Actual.	Variation from normal.
Akola	110	+27	84	— 1	95	+15
Buldana	151	+26	108	—14	118	—14
Khandwa	100	+29	75	+11	79	+17
Nagpur	112	+10	101	+ 6	98	+15

STATION.	MEAN WIND STEADINESS IN					
	OCTOBER.		NOVEMBER.		DECEMBER.	
	Actual percentage.	Variation from normal.	Actual percentage.	Variation from normal.	Actual percentage.	Variation from normal.
Akola	51	+19	44	— 5	50	— 7
Buldana	42	— 7	22	—30	39	— 4
Khandwa	21	—14	3	—49	24	—18
Nagpur	52	+ 3	30	—30	43	—11

(9) The air movement was stronger and steadier than

usual generally over the Peninsula, south of Lat. 18° N. as shown below :—

DIVISION.	MEAN DAILY AIR MOVEMENT IN					
	OCTOBER.		NOVEMBER.		DECEMBER.	
	Actual.	Variation from normal.	Actual.	Variation from normal.	Actual.	Variation from normal.
Hyderabad	86	—10	69	—19	73	— 8
Bombay Deccan	210	+19	200	— 1	222	+17
Madras Deccan	105	+ 1	96	+19	98	+22
Mysore	120	— 4	162	+19	188	+20
Bombay Coast	110	—30	133	— 9	135	—16
Madras Coast	184	+36	182	—26	162	—48
Southern India	56	— 4	96	+22	108	+16

DIVISION.	MEAN WIND STEADINESS IN					
	OCTOBER.		NOVEMBER.		DECEMBER.	
	Actual.	Variation from normal.	Actual.	Variation from normal.	Actual.	Variation from normal.
Hyderabad	58	+25	60	— 7	52	—13
Bombay Deccan	31	+13	56	— 7	72	+10
Madras Deccan	45	+31	59	+ 4	92	+23
Mysore	51	+36	75	+ 4	87	+ 4
Bombay Coast	41	— 7	55	+ 6	43	—13
Madras Coast	42	+17	64	— 6	77	— 4
Southern India	11	—18	40	+16	58	+ 8

Humidity.

The variation of the mean monthly and annual aqueous vapour pressure and humidity values from the calculated normals for the year 1899 are given in Tables VIII and IX. The normal values employed in the determination of the variations are given in Tables XIII and XIV of the Annual Summary for the year 1896. The four tables (Tables X to XIII) give variation data of aqueous vapour

pressure and relative humidity for each month of the year and for the year :—

1st.—For sixteen meteorological areas adopted in the geographical summaries of meteorological data in the annual reports issued by the department previous to 1891.

2nd.—For nine meteorological provinces of the Empire.

TABLE VIII.—Comparison of the monthly mean vapour pressure data of 1899 with the averages of past years.

METEOROLOGICAL PROVINCE.	STATION.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	YEAR.
		"	"	"	"	"	"	"	"	"	"	"	"	"
BURMA COAST AND BAY ISLANDS.	Port Blair	-.012	-.052	-.017	-.011	+.010	-.006	+.024	+.021	+.017	+.031	-.068	-.038	-.008
	Rangoon	-.043	+.066	-.016	+.015	+.033	-.008	+.020	+.020	+.008	+.006	-.052	-.120	-.006
	Diamond Island	+.042	+.005	+.006	-.019	0	-.008	+.015	+.026	+.023	+.018	-.041	-.059	+.001
	Cocos Island	+.001	+.017	+.027	+.057	+.031	+.002	+.010	+.022	+.019	-.013	-.034	-.032	+.009
	Akyab	+.007	+.111	+.108	+.128	+.075	+.028	-.003	+.027	+.019	?	?	?	?
BENGAL AND ORISSA.	Chittagong	-.029	+.058	+.034	+.022	+.054	+.040	+.006	+.025	+.013	0	-.077	-.020	+.011
	Calcutta (Alipore)	-.019	+.008	-.036	-.029	+.051	-.013	+.009	+.029	+.008	-.021	-.053	-.005	-.005
	Saugor Island	-.062	+.024	+.019	-.014	+.028	-.033	+.017	+.017	+.011	-.028	-.051	+.014	-.005
	False Point	-.002	+.063	+.041	+.018	+.042	+.026	+.014	+.066	+.022	+.040	-.002	+.054	+.032
GANGETIC PLAIN AND CHOTA NAGPUR.	Hazaribagh	-.027	+.094	-.053	+.036	+.070	-.024	-.026	-.001	-.096	-.086	-.088	-.051	-.021
	Darbhanga	-.034	+.025	+.059	-.004	+.029	+.029	+.025	+.035	+.027	+.028	+.001	+.011	+.019
	Allahabad	-.053	-.006	-.009	-.001	+.032	-.068	-.028	-.023	-.093	-.099	-.016	-.025	-.032
UPPER SUB-HIMALAYAS.	Dehra Dun	-.049	-.007	+.007	-.048	+.082	-.056	+.014	-.016	-.109	-.103	-.072	-.055	-.034
	Roorkee	-.070	-.021	-.038	-.059	+.071	-.031	+.038	-.036	-.205	-.142	-.060	-.063	-.051
	Meerut	-.094	+.006	+.005	-.034	+.087	+.027	+.046	-.034	-.134	-.076	-.010	-.017	-.019
	Lahore	-.077	+.001	-.038	-.023	+.049	+.059	-.004	-.106	-.205	-.127	-.026	-.023	-.043
	Ludhiana	-.067	-.020	-.073	-.116	-.052	-.054	-.040	-.115	-.253	-.192	-.052	-.046	-.091
INDUS VALLEY AND NORTH-WEST RAJ-PUTANA.	Peshawar	-.054	+.043	+.030	-.030	+.039	+.022	+.042	-.084	-.099	-.060	-.027	0	-.016
	Jacobabad	-.063	+.031	+.028	-.029	+.082	+.042	+.076	+.007	+.014	-.029	+.001	+.034	+.016
	Kurrachee	-.076	+.038	+.019	+.032	+.081	-.026	+.012	+.040	-.019	-.058	+.054	+.094	+.016
EASTERN RAJ-PUTANA, CENTRAL INDIA AND GUJARAT.	Jaipur	-.092	-.019	-.024	+.006	+.135	-.017	-.075	-.104	-.093	-.105	-.027	-.025	-.037
	Deesa	-.099	-.035	-.065	-.056	+.021	-.032	-.122	-.145	-.129	-.198	-.066	-.027	-.079
	Belgaum	-.059	-.007	-.002	+.016	-.012	-.006	-.010	-.013	+.006	-.032	-.10	-.125	-.029
	Sholapur	-.113	-.046	-.046	+.076	-.003	-.041	-.093	-.094	-.061	-.174	-.217	-.163	-.081
	Poona	-.094	-.026	-.065	+.051	+.032	-.018	-.041	-.053	-.032	-.096	-.121	-.108	-.048
DECCAN.	Akola	-.140	-.039	-.094	+.095	+.107	+.001	-.075	-.071	-.130	-.244	-.169	-.075	-.070
	Buidana	-.152	-.073	-.127	+.013	-.006	-.039	-.097	-.102	-.135	-.268	-.226	-.144	-.113
	Khandwa	-.140	-.077	-.102	-.027	+.025	-.045	-.064	-.083	-.154	-.217	-.156	-.113	-.096
	Nagpur	-.123	-.014	-.059	+.113	+.117	-.029	-.060	-.051	-.113	-.178	-.135	-.071	-.053
	Hyderabad (Deccan.)	-.076	-.044	-.078	+.027	+.021	-.045	-.062	-.031	-.030	-.138	-.147	-.107	-.059
WEST COAST.	Bombay	-.116	-.033	-.035	-.038	-.033	-.061	-.058	-.049	-.050	-.017	-.026	-.048	-.047
	Karwar	-.062	-.019	+.029	-.032	-.026	-.024	-.019	-.023	-.019	+.002	-.042	-.082	-.031
SOUTH INDIA.	Salem	+.002	+.034	+.041	+.035	+.022	-.031	-.037	-.018	+.014	+.005	-.068	-.089	-.008
	Chitaldroog	-.016	+.018	-.045	+.132	+.031	-.008	0	-.022	+.026	-.010	-.121	-.089	-.009

TABLE VIII.—Comparison of the monthly mean vapour pressure data of 1899 with the averages of past years—concl'd.

METEOROLOGICAL PROVINCE.	STATION.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	YEAR.
SOUTH INDIA <i>contd.</i>	Bangalore .	"	"	"	"	"	"	"	"	"	"	"	"	"
	Hassan .	—'023	+ '007	—'099	+ '050	+ '019	—'040	—'048	—'044	+ '030	—'015	—'137	—'105	—'034
	Mysore .	—'049	—'006	—'108	+ '017	—'025	+ '009	+ '005	—'017	+ '027	—'010	—'170	—'149	—'040
	Madras .	—'068	—'024	—'085	+ '021	—'016	—'014	—'032	—'069	+ '039	+ '019	—'154	—'067	—'038
	Bellary .	—'001	+ '031	+ '005	+ '040	—'009	—'053	—'022	+ '015	+ '037	+ '035	—'011	—'018	+ '004
	Cocanada .	—'115	+ '025	—'025	—'027	—'112	—'130	—'130	—'117	—'088	—'107	—'148	—'116	—'091
HILL STATION, BALUCHISTAN.	Vizgapatam .	—'050	—'018	—'052	—'005	—'078	—'040	—'135	—'024	—'024	—'024	—'122	—'075	—'054
	Quetta .	+ '025	+ '037	—'012	+ '048	+ '049	+ '076		Observatory	closed.				?
	Leh .	—'056	0	+ '005	—'049	+ '028	—'025	—'160	—'074	—'050	—'024	+ '024	+ '024	—'030
HILL STA- TIONS, NORTHERN INDIA.	Srinagar .	—'041	—'017	+ '022	+ '033	+ '003	+ '010	+ '016	—'011	—'021	+ '005	+ '025	—'019	0
	Kailang .	—'024	+ '025	+ '088	+ '040	+ '131	+ '151	?	+ '057	+ '029	+ '072	+ '044	+ '030	+ '058
	Simla (Ridge) .	—'027	—'003	+ '013	—'005	+ '022	+ '011	+ '010	—'037	—'034	—'028	+ '002	—'004	—'007
	Chakrata .	—'038	—'017	—'013	—'043	+ '046	—'015	—'010	—'054	—'111	—'070	—'032	—'025	—'032
	Ranikhet .	—'036	+ '006	—'026	—'036	+ '027	—'030	+ '017	—'016	—'084	—'089	—'052	—'029	—'029
HILL STA- TIONS,CEN- TRAL INDIA.	Katmandu .	?	—'007	—'038	—'045	+ '032	—'037	+ '017	—'017	—'079	—'096	—'061	—'040	—'034
	Darjeeling .	—'029	+ '016	+ '010	—'040	+ '033	+ '026	+ '009	+ '011	—'002	—'009	—'007	—'020	0
	Mount Abu .	—'021	?	+ '070	+ '010	+ '048	+ '003	+ '011	+ '020	+ '011	+ '006	0	—'007	+ '014
	Pachmarhi .	—'060	—'014	—'025	—'020	+ '035	—'047	—'050	—'066	—'077	—'115	—'020	+ '003	—'038
	Chikalda .	—'065	+ '037	+ '038	+ '109	+ '138	+ '081	—'009	—'011	—'081	—'122	—'069	—'060	—'001
HILL STATION, SOUTHERN INDIA.	Wellington .	—'100	—'041	—'076	+ '012	+ '069	—'003	—'024	—'014	—'066	—'147	—'144	—'092	—'052
	Aden .	—'030	+ '019	—'085	+ '069	—'021	—'025	—'035	—'022	+ '012	—'008	—'089	—'090	—'025
EXTRAINDIAN STATIONS.	Perim .	—'055	—'009	—'055	—'044	—'043	—'068	—'077	—'035	—'047	—'091	+ '068	+ '007	—'042
	Zanzibar .	+ '015	?	—'014	+ '026	+ '069	+ '149	+ '016	+ '008	+ '065	—'029	+ '040	+ '043	+ '035
	Port Victoria (Seychelles).	—'038	—'027	—'059	—'015	—'075	—'060	—'017	—'028	—'042	—'024	—'010	—'017	—'034
		—'039	—'037	—'005	—'006	+ '012	—'002	+ '018	+ '019	—'015	—'008	—'003	—'009	—'006

TABLE IX.—Comparison of the monthly mean relative humidity data of 1899 with the averages of past years.

METEOROLOGICAL PROVINCE.	STATION.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	YEAR.
BURMA COAST AND BAY ISLANDS.	Port Blair .	— 5	— 3	— 2	+ 3	+ 2	0	— 3	— 1	+ 1	— 1	— 2	— 1	— 1
	Rangoon .	— 4	+ 7	— 3	+ 1	+ 9	0	0	+ 2	0	— 3	— 1	— 9	0
	Diamond Island	0	— 1	— 1	— 3	+ 8	— 3	— 4	— 1	— 2	— 4	— 5	— 6	+ 2
	Cocos Island .	— 3	0	+ 1	+ 2	0	— 2	— 5	— 4	— 1	— 4	— 6	— 3	— 2
	Akyab .	+ 3	+ 10	+ 6	+ 8	+ 9	+ 3	+ 1	— 1	— 1	?	?	?	?

TABLE IX.—Comparison of the monthly mean relative humidity data of 1899 with the averages of past years—contd.

PROVINCE.	STATION.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	YEAR.
BENGAL AND ORISSA.	Chittagong .	-1	+5	0	+6	+3	+1	+2	0	0	+2	-1	+3	+2
	Calcutta (Alipore) .	-3	-2	-8	-5	+2	-1	0	-3	-5	-4	-5	-4	-3
	Saugor Island .	-4	+2	-1	-1	+3	+1	-1	-2	-3	-2	-3	-1	-1
	False Point .	-3	+2	-1	0	+3	+4	-1	+1	-3	+3	+2	+2	+1
GANGETIC PLAIN AND CHOTA NAGPUR.	Hazaribagh .	+1	-2	-9	+4	+6	-1	0	-5	-18	-12	-14	-12	-5
	Darbhangha .	+2	+2	+2	+2	+1	+4	+6	+1	0	0	+1	+2	+2
	Allahabad .	-3	-6	-6	+1	+1	+2	+4	-6	-12	-12	-7	-11	-5
UPPER SUB-HIMALAYAS.	Dehra Dun .	-6	-4	-5	-2	+7	-2	+3	-9	-15	-18	-14	-15	-7
	Roorkee .	-6	-7	-10	-5	+3	+2	+6	-9	-21	-15	-10	-13	-7
	Meerut .	-13	-3	-7	-4	-3	+8	+7	-11	-18	-10	-5	-8	-6
	Lahore .	-9	-3	-7	0	-1	+7	-3	-12	-18	-11	-7	-8	-6
INDUS VALLEY AND NORTH-WEST RAJ-PUTANA.	Ludhiana .	-9	-8	-16	-12	-10	-4	-5	-16	-27	-20	-11	-24	-14
	Peshawar .	-13	+7	-1	-5	-4	-1	0	-9	-12	-9	-11	-9	-6
	Jacobabad .	-10	+3	-1	-6	+2	0	+3	-2	-1	-5	-3	0	-2
EAST RAJPUTANA, CENTRAL INDIA AND GUJARAT.	Kurrachee .	-11	+2	+2	-3	+3	-4	+1	-1	-3	-7	+1	+3	-1
	Jaipur .	-15	-7	-9	-1	+5	+2	-9	-25	-17	-16	-11	-12	-10
	Deesa .	-10	-4	-5	-3	+4	-1	-17	-22	-16	-22	-12	-8	-10
DECCAN.	Belgaum .	-2	+4	+4	+9	+1	+2	-3	-5	-2	-7	-11	-15	-2
	Sholapur .	-12	-6	-7	+10	+1	-5	-15	-15	-9	-26	-27	-22	-11
	Poona .	-3	+3	-2	+14	+6	-1	-7	-10	-6	-13	-9	-11	-3
	Akola .	-17	-5	-10	+9	+7	0	-12	-15	-22	-32	-27	-21	-12
	Buldana .	-20	-9	-14	+6	+1	-3	-14	-18	-22	-36	-32	-25	-16
	Khandwa .	-15	-11	-13	-3	+1	-5	-9	-17	-24	-30	-25	-23	-15
	Nagpur .	-15	-3	-12	+12	+7	-4	-9	-10	-19	-23	-22	-16	-10
	Hyderabad (Decan). .	-10	-5	-10	+4	+3	-6	-12	-9	-8	-21	-21	-17	-9
WEST COAST.	Bombay .	-10	-3	-5	-4	-5	-3	-8	-9	-8	-8	-4	-8	-6
	Karwar .	-4	-1	0	0	-1	-1	-7	-5	-2	-3	-2	-5	-3
	Salem .	+2	+5	+1	+10	+3	-5	-9	-8	+1	-1	-10	-11	-2
SOUTH INDIA.	Chitaldroog .	0	+3	-4	+16	+3	0	-5	-8	+3	-5	-19	-13	-2
	Bangalore .	-1	+2	-9	+9	+4	-4	-11	-10	+3	-5	-16	-12	-4
	Hassan .	-2	+1	-12	+6	-2	+1	-4	-6	+2	-4	-19	-15	-5
	Mysore .	-6	-3	-8	+3	-2	-1	-8	-9	+5	0	-13	-10	-4
	Madras .	+1	+2	+2	+5	-7	-8	-6	-4	+3	+5	-1	+3	0
	Bellary .	-12	+3	-3	+3	-7	-11	-15	-13	-8	-13	-18	-14	-9
	Cocanada .	-6	-4	-4	0	-3	-4	-20	-7	-6	-4	-11	-9	-7
	Vizagapatam .	+4	+4	+1	+6	+4	+9		Observatory closed.					

TABLE IX.—Comparison of the monthly mean relative humidity data of 1899 with the averages of past years—concl'd.

PROVINCE.	STATION.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	YEAR.
HILL STATION, BALUCHISTAN	Quetta . .	-18	-7	-3	-9	+1	-4	-16	-10	-7	-4	0	-1	-7
	Leh . .	-12	-8	+3	+14	0	0	-2	+2	0	+5	+9	-15	0
	Srinagar . .	+4	+6	+8	+12	+12	+11	?	+7	+3	+2	+5	+5	+7
	Kailang . .	-2	-1	+1	+4	+1	-1	-2	-7	-7	-7	+5	-5	-2
HILL STATIONS, NORTHERN INDIA.	Simla (Ridge) .	-5	-7	-8	-2	+7	0	+1	-10	-18	-13	-9	-7	-6
	Chakrata . .	-7	-3	-13	0	+2	-2	+3	-3	-17	-20	-16	-12	-7
	Ranikhet . .	?	-5	-15	-2	-1	-2	+4	-7	-17	-19	-14	-13	-8
	Katmandu . .	0	0	-3	-4	-1	+4	+1	+1	-3	-3	-2	-5	-1
HILL STATIONS, CENTRAL INDIA.	Darjeeling . .	+1	?	+16	+6	+3	+1	+2	0	0	+5	+4	-2	+3
	Mount Abu . .	-9	-4	-7	-2	+3	-5	-6	-17	-15	-20	-7	-6	-8
	Pachmarhi . .	-7	+3	-2	+9	+10	+10	+3	-10	-17	-21	-16	-14	-4
	Chikalda . .	-15	-7	-11	+5	+7	-1	-3	-8	-17	-28	-27	-20	-10
HILL STATION, SOUTH INDIA.	Wellington . .	-10	+3	-15	+12	-3	-5	-10	-6	0	-5	-17	-20	-6
	Aden . .	-5	+1	-5	-4	-5	-4	-10	-8	-5	-8	+2	0	-4
	Perim . .	+4	?	+2	+3	+8	+10	+2	+1	+7	-1	+5	+3	+4
EXTRAINDIAN STATIONS.	Zanzibar . .	-4	-3	-3	+1	-4	-4	0	-1	-4	-3	-6	-3	-3
	Port Victoria (Seychelles).	-1	-2	-2	-2	+1	0	+2	+3	+1	+1	0	0	0
	Mauritius . .	-2	+4	+3	+1	0	0	-1	+1	+1	+5	+3	-3	+1

TABLE X.—Geographical summary of the aqueous vapour pressure data of Table II in the monthly weather reviews of 1899.

METEOROLOGICAL AREA.	Number of stations.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	YEAR.
		"	"	"	"	"	"	"	"	"	"	"	"	"
North-West Himalaya	5-6	-.033	-.002	+.008	-.009	+.044	+.015	+.010	-.013	-.050	-.034	-.012	-.017	-.008
Sikkim Himalaya and Nepal.	1-2	-.025	+.016	+.040	-.015	+.041	+.015	+.010	+.016	+.005	-.002	-.004	-.014	+.007
Punjab Plains . .	3	-.069	+.008	-.027	-.056	+.012	+.006	-.001	-.102	-.186	-.126	-.035	-.022	-.050
Gangetic Plain . .	5	-.060	-.001	+.005	-.029	+.060	-.020	+.019	-.015	-.103	-.078	-.031	-.030	-.024
Western Rajputana .	4	-.075	+.005	-.011	-.018	+.055	-.016	-.021	-.041	-.053	-.100	-.008	+.026	-.021
Eastern Rajputana and Central India.	1	-.092	-.019	-.024	+.006	+.135	-.017	-.075	-.104	-.093	-.105	-.027	-.025	-.037
Nerbudda Valley . .	1	-.140	-.077	-.102	-.027	+.025	-.045	-.064	-.083	-.154	-.217	-.156	-.113	-.096
Chota Nagpur . .	1	-.027	+.094	-.053	+.036	+.070	-.024	-.026	-.001	-.096	-.086	-.088	-.051	-.021
Lower Bengal . .	2	-.041	+.016	-.009	-.022	+.045	-.023	+.013	+.023	+.010	-.025	-.052	+.005	-.005
Orissa . .	1	-.002	+.063	+.041	+.018	+.042	+.026	+.014	+.066	+.022	+.040	-.002	+.054	+.032
Central Provinces, (South) and Berar.	5	-.116	-.026	-.070	+.068	+.085	+.002	-.053	-.050	-.105	-.192	-.149	-.088	-.058
Konkan . .	2	-.089	-.026	-.032	-.035	-.030	-.043	-.039	-.036	-.035	-.008	-.034	-.065	-.039

TABLE X.—Geographical summary of the aqueous vapour pressure data of Table II in the monthly weather reviews of 1899.—concl'd.

METEOROLOGICAL AREA.	Number of stations.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	YEAR.
		"	"	"	"	"	"	"	"	"	"	"	"	"
Deccan. Hyderabad and Mysore.	9	-.058	-.011	-.061	+.040	-.007	-.033	-.046	-.051	-.009	-.063	-.147	-.114	-.048
East Coast and Carnatic.	3-4	-.006	+.021	-.005	+.030	-.004	-.012	-.065	-.009	+.009	+.005	-.067	-.061	-.014
Arakan and Pegu .	3-4	-.006	+.050	+.033	+.037	+.041	+.013	+.010	+.025	+.016	+.008	-.057	-.066	+.010
Bay Islands . .	2	-.006	-.018	+.005	+.023	+.021	-.002	+.017	+.022	+.018	+.009	-.051	-.035	0
Extra-Tropical India .	25-26	-.055	+.005	-.005	-.019	+.048	-.005	-.002	-.026	-.072	-.069	-.029	-.014	-.020
Tropical India . .	25-27	-.054	+.001	-.034	+.038	+.017	-.014	-.035	-.027	-.021	-.059	-.108	-.086	-.032
Whole India . .	51-53	-.054	+.003	-.020	+.010	+.033	-.010	-.019	-.026	-.046	-.064	-.068	-.049	-.026

TABLE XI.—Geographical summary of the humidity data of Table II in the monthly weather reviews of 1899.

METEOROLOGICAL AREA.	Number of stations.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	YEAR.
North-West Himalaya	5-6	-4	-3	-4	+4	+4	+1	+1	-3	-9	-9	-3	-8	-3
Sikkim Himalaya and Nepal.	1-2	+1	0	+7	+1	+1	+3	+2	+1	-2	+1	+1	-4	+1
Punjab Plain . .	3	-10	-1	-8	-6	-5	+1	-3	-12	-19	-13	-10	-14	-8
Gangetic Plain . .	5	-5	-4	-5	-2	+2	+3	+5	-7	-13	-11	-7	-9	-4
Western Rajputana .	4	-10	-1	-3	-4	+3	-3	-5	-11	-9	-14	-5	-3	-5
Eastern Rajputana and Central India.	1	-15	-7	-9	-1	+5	+2	-9	-25	-17	-16	-11	-12	-10
Nerbudda Valley .	1	-15	-11	-13	-3	+1	-5	-9	-17	-24	-30	-25	-23	-15
Chota Nagpur . .	1	+1	-2	-9	+4	+6	-1	0	-5	-18	-12	-14	-12	-5
Lower Bengal . .	2	-4	0	-5	-3	+3	0	-1	-3	-4	-3	-4	-3	-2
Orissa	1	-3	+2	-1	0	+3	+4	-1	+1	-3	+3	+2	+2	-1
Central Provinces (South) and Berar.	5	-15	-4	-10	+8	+6	0	-7	-12	-19	-28	-25	-19	-10
Konkan	2	-7	-2	-3	-2	-3	-2	-8	-7	-5	-6	-3	-7	-5
Deccan, Hyderabad and Mysore.	9	-5	0	-6	+8	+1	-3	-9	-9	-2	-10	-17	-14	-6
East Coast and Carnatic.	3-4	0	+2	0	+5	-1	-2	-12	-6	-1	0	-7	-6	-2
Arakan and Pegu .	3-4	-1	+5	+1	+3	+7	0	0	0	-1	-2	-2	-4	-1
Bay Islands . .	2	-4	-2	-1	+3	+1	-2	-4	-3	0	-3	-4	-2	-2
Extra-Tropical India .	25-26	-6	-2	-4	-1	+2	+1	-1	-7	-11	-10	-6	-8	-4
Tropical India . .	25-27	-6	0	-4	+6	+2	-2	-7	-7	-5	-10	-13	-12	-5
Whole India . .	50-53	-6	-1	-4	+3	+2	0	-4	-7	-8	-10	-10	-10	-5

TABLE XII.—*Variations of the mean monthly aqueous vapour pressure from the normal in 1899 in nine meteorological provinces of India.*

METEOROLOGICAL PROVINCES.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	YEAR.
	"	"	"	"	"	"	"	"	"	"	"	"	"
Burma Coast and Bay Islands	−'002	+ '033	+ '022	+ '028	+ '030	+ '002	+ '014	+ '024	+ '017	+ '018	− '054	− '079	+ '004
Bengal and Orissa . . .	− '029	+ '038	+ '015	− '001	+ '046	+ '005	+ '003	+ '034	+ '014	+ '002	− '046	+ '011	+ '008
Gangetic Plain and Chota Nagpur.	− '037	+ '038	− '001	+ '010	+ '044	− '021	− '010	+ '004	− '054	+ '052	− '034	− '022	− '003
Upper Sub-Himalayas . .	− '071	− '008	− '027	− '056	+ '047	− '013	+ '011	− '061	− '181	− '128	− '044	− '040	− '048
Indus Valley and North-West Rajputana.	− '068	+ '037	+ '026	− '009	+ '067	+ '013	+ '043	− '012	− '035	− '049	+ '009	+ '043	+ '005
East Rajputana, Central India and Gujarat.	− '096	− '027	− '045	− '025	+ '078	− '025	− '099	− '125	− '111	− '152	− '047	− '026	− '058
Deccan	− '112	− '041	− '075	+ '046	+ '035	− '028	− '063	− '062	− '081	− '168	− '160	− '113	− '069
West Coast	− '089	− '026	− '003	− '035	− '030	− '043	− '039	− '036	− '035	− '008	− '034	− '065	− '037
South India	− '033	+ '012	− '051	− '035	− '013	− '026	− '050	− '037	+ '008	− '013	− '116	− '088	− '037

TABLE XIII.—*Variations of the mean monthly relative humidity from the normal in 1899 in the nine meteorological provinces of India.*

METEOROLOGICAL PROVINCES.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	YEAR.
Burma Coast and Bay Islands	− 2	+ 3	0	+ 2	+ 7	0	− 2	0	− 1	− 3	− 3	− 5	0
Bengal and Orissa . . .	− 3	+ 2	− 3	0	+ 3	+ 1	+ 1	− 1	− 3	0	− 2	0	0
Gangetic Plain and Chota Nagpur.	0	− 2	− 4	+ 2	+ 3	+ 2	+ 3	− 3	− 10	− 8	− 7	− 7	− 3
Upper Sub-Himalayas . .	− 8	− 5	− 9	− 5	− 1	+ 2	+ 2	− 11	− 20	− 15	− 9	− 13	− 8
Indus Valley and North-West Rajputana.	− 11	+ 4	0	− 5	0	− 2	+ 1	− 4	− 5	− 7	− 4	− 2	− 3
East Rajputana, Central India and Gujarat.	− 13	− 5	− 7	− 2	+ 5	+ 1	− 13	− 24	− 17	− 19	− 12	− 10	− 10
Deccan	− 12	− 4	− 8	+ 8	+ 3	− 3	− 10	− 12	− 14	− 24	− 22	− 19	− 10
West Coast	− 7	− 2	− 3	− 2	− 3	− 2	− 8	− 7	− 5	− 6	− 3	− 7	− 5
South India	− 2	+ 1	− 4	+ 6	0	− 3	− 10	− 8	0	− 3	− 13	− 10	− 4

I.—The cold weather period :—Weather was less disturbed by storms than usual in January. A large number of cold weather depressions affected Upper India in February, but they were feeble and their influence on the humidity conditions was very slight. The air was very

dry over nearly the whole of the interior of India in both months, this condition being more pronounced in January than in February. The following gives the more important features :—

(1) The variations from the mean humidity conditions

were small and somewhat irregular in Burma and North-Eastern India. The following gives comparative data:—

AREA.	VARIATION OF MEAN ABSOLUTE HUMIDITY FROM NORMAL IN			VARIATION OF MEAN RELATIVE HUMIDITY FROM NORMAL IN		
	January.	February.	Period, January and February.	January.	February.	Period, January and February.
Lower Burma . . .	—'001	+ '036	+ '018	—2	+ 3	+ 1
Bengal . . .	—'037	+ '030	—'004	—3	+ 2	—1
Orissa . . .	—'002	+ '063	+ '031	—3	+ 2	—1
Bihar . . .	—'034	+ '025	—'005	+ 2	+ 2	+ 2
Chota Nagpur . . .	—'027	+ '054	+ '034	+ 1	—2	—1

(2) Humidity was, on the mean of the period, very slightly above the normal in Southern India and the Madras Coast and less than the normal in the South Deccan. The following gives comparative data for three provinces or areas:—

AREA.	VARIATION OF MEAN ABSOLUTE HUMIDITY FROM NORMAL IN			VARIATION OF MEAN RELATIVE HUMIDITY FROM NORMAL IN		
	January.	February.	Period, January and February.	January.	February.	Period, January and February.
South Deccan . . .	—'115	+ '045	—'045	—12	+ 3	—5
Madras Coast . . .	—'009	+ '017	+ '004	0	+ 1	+ 1
South India . . .	+ '002	+ '034	+ '018	+ 2	+ 5	+ 4

(3) The air was much drier than usual in the Indus Valley in January and damper in February. Hence on the mean of the period humidity was in slight defect. The following gives data for three stations in that area:—

STATION.	VARIATION OF ABSOLUTE HUMIDITY FROM NORMAL IN			VARIATION OF RELATIVE HUMIDITY FROM NORMAL IN		
	January.	February.	Period, January and February.	January.	February.	Period, January and February.
Peshawar . . .	—'064	+ '043	—'011	—13	+ 7	—3
Jacobabad . . .	—'063	+ '031	—'016	—10	+ 3	—4
Kurrachee . . .	—'076	+ '038	—'019	—11	+ 2	—5

(4) The air was remarkably dry over the large area in the interior including Rajputana, the North-Western Provinces, Central India, Berar, the Central Provinces and the North and Central Deccan. The following gives data:—

AREA.	VARIATION OF MEAN ABSOLUTE HUMIDITY FROM NORMAL IN			VARIATION OF MEAN RELATIVE HUMIDITY FROM NORMAL IN		
	January.	February.	Period, January and February.	January.	February.	Period, January and February.
North-Western Provinces.	—'066	—'037	—'037	—7	—5	—6
Rajputana . . .	—'096	—'027	—'062	—13	—6	—10
Berar . . .	—'146	—'056	—'101	—19	—7	—13
Central Provinces . . .	—'132	—'046	—'089	—15	—7	—11
Bombay Deccan . . .	—'089	—'026	—'058	—6	0	—3
Hyderabad Deccan . . .	—'076	—'044	—'060	—10	—5	—8

The following gives comparative data for seven stations in the area of most excessive dryness of the air:—

STATION.	ABSOLUTE HUMIDITY.			RELATIVE HUMIDITY.		
	Actual, January and February.	Normal, January and February.	Mean variation from normal, January and February.	Actual, January and February.	Normal, January and February.	Mean variation from normal, January and February.
Sholapur . . .	'256	'336	—'080	31	40	—9
Chikalda . . .	'224	'295	—'071	36	47	—11
Buldana . . .	'181	'204	—'113	25	40	—15
Nagpur . . .	'280	'349	—'069	38	47	—9
Khandwa . . .	'208	'317	—'109	32	45	—13
Jaipur . . .	'210	'266	—'056	37	48	—11
Akola . . .	'221	'311	—'090	32	43	—11

(5) The variations at the hill stations in North-Western

India were similar to those in the adjacent plains. The following gives comparative data for seven stations :—

STATION.	VARIATION OF ABSOLUTE HUMIDITY FROM NORMAL IN			VARIATION OF RELATIVE HUMIDITY FROM NORMAL IN		
	January.	February.	Period, January and February.	January.	February.	Period, January and February.
Leh	—'041	—'017	—'029	—12	—8	—10
Kailang	—'027	—'003	—'015	—2	—1	—2
Srinagar	—'024	+ '025	+ '001	+ 4	+6	+ 5
Simla	—'038	—'017	—'028	—5	—7	—6
Chakrata	—'036	+ '006	—'015	—7	—3	—5
Ranikhet	?	—'007	?	?	—5	?
Mount Abu	—'060	—'014	—'037	—9	—4	—7

(6) The air was excessively dry in Baluchistan and considerably drier than usual in Arabia and at Baghdad, and humidity was probably in slight excess in Persia as is shown by the following comparative data :—

STATION.	VARIATION OF ABSOLUTE HUMIDITY FROM NORMAL IN.			VARIATION OF RELATIVE HUMIDITY FROM NORMAL IN		
	January.	February.	Period, January and February.	January.	February.	Period, January and February.
Quetta	—'056	0	—'028	—18	—7	—13
Muscat	—'052	—'039	—'046	—4	—6	—5
Aden	—'055	—'009	—'032	—5	+1	—2
Bushire	—'017	+ '025	+ '004	+ 1	+6	+ 4
Baghdad	—'013	—'017	—'015	—2	—3	—3

II.—The hot weather period:—March resembled January and February as the air was much drier than usual over practically the whole of India. A large change occurred in the beginning of April which reverted the humidity conditions over the greater part of India. Weather was more disturbed than usual with much rain, which fell chiefly as thundershowers in North-Eastern India and the Peninsula. The air was hence on the mean of the month

much damper in the interior of the Peninsula and slightly damper in the coast districts and North-Eastern India.

Drier weather than usual held steadily in Upper India in both April and May. Over the remainder of India the conditions in May did not differ much from the normal, the air being slightly damper than usual, either accompanying frequent thunderstorms or as a residual effect of the heavy rain over the Peninsula during the previous month.

The mean humidity conditions of this period differed less from the normal than during the other periods of the year. The following gives a summary of the chief features :—

(1) Weather was considerably drier than usual in Upper India throughout the period, as shown below :—

AREA.	VARIATION OF MEAN ABSOLUTE HUMIDITY FROM NORMAL IN				VARIATION OF MEAN RELATIVE HUMIDITY FROM NORMAL IN			
	March.	April.	May.	Period, March to May.	March.	April.	May.	Period, March to May.
Baluchistan (Quetta).	+ '005	—'049	+ '028	—'005	+3	—9	+1	—4
Punjab	—'027	—'056	+ 012	—'024	—8	—6	—5	—6
Sind	+ '024	+ '002	+ '002	+ '035	+1	—5	+3	0

(2) The variations were smaller at the hill stations in Upper India than in the neighbouring plains :—

STATION.	VARIATION OF ABSOLUTE HUMIDITY FROM NORMAL IN				VARIATION OF RELATIVE HUMIDITY FROM NORMAL IN			
	March.	April.	May.	Period, March to May.	March.	April.	May.	Period, March to May.
Leh	+ '022	+ '033	+ '003	+ '019	+ 3	+14	0	+ 6
Srinagar	+ '088	+ '040	+ '131	+ '086	+ 8	+12	+12	+11
Simla	—'013	—'043	+ '046	—'003	—8	—2	+7	—1
Chakrata	—'026	—'036	+ '027	—'012	—13	0	+2	—4
Ranikhet	—'038	—'045	+ '032	—'017	—15	—2	—1	—6

(3) The variations of the humidity conditions from the

normal were small throughout the period in North-Eastern India and Burma. The following gives data:—

AREA.	VARIATION OF MEAN ABSOLUTE HUMIDITY FROM NORMAL IN				VARIATION OF MEAN RELATIVE HUMIDITY FROM NORMAL IN			
	March.	April.	May.	Period March to May.	March.	April.	May.	Period March to May.
Bihar . . .	+ '059	- '004	+ '029	+ '028	+ 2	+ 2	+ 1	+ 2
Chota Nagpur . .	- '053	+ '036	+ '070	+ '018	- 9	+ 4	+ 6	0
Bengal . . .	+ '005	- '007	+ '048	+ '016	- 3	0	+ 3	0
Orissa . . .	+ '041	+ '018	+ '042	+ '034	- 1	0	+ 3	+ 1
Burma . . .	+ '033	+ '041	+ '036	+ '037	+ 1	+ 2	+ 8	+ 4
Port Blair . . .	- '017	- '011	+ '010	- '006	- 2	+ 3	+ 2	+ 1

(4) The air was much drier in March in Central India and the Peninsula, much damper in April, and generally slightly damper in May. It was drier than usual in March and April in Rajputana and the North-Western Provinces and damper in May, as is shown below:—

AREA.	VARIATION OF MEAN ABSOLUTE HUMIDITY FROM NORMAL IN				VARIATION OF MEAN RELATIVE HUMIDITY FROM NORMAL IN			
	March.	April.	May.	Period March to May.	March.	April.	May.	Period March to May.
Rajputana . . .	- '045	- '025	- '078	- '049	- 7	- 2	+ 5	- 1
North-Western Provinces.	- '009	- '036	- '068	- '038	- 7	- 3	+ 2	- 3
Bejar . . .	- '111	+ '054	+ '051	- '002	- 12	+ 8	+ 4	0
Central Provinces.	- '096	+ '043	+ '071	+ '006	- 13	+ 5	+ 4	- 1
Bombay Deccan . .	- '038	+ '048	+ '009	+ '005	- 2	+ 11	+ 3	+ 4
Madras Deccan . .	- '025	- '027	- '112	- '055	- 3	+ 3	- 7	- 2
Bombay Coast . .	- '003	- '035	- '030	- '023	- 3	- 2	- 3	- 3
Madras Coast . .	- '020	+ '028	- '013	- '002	0	+ 4	0	+ 1
Mysore . . .	- '084	+ '055	+ '002	- '009	- 8	+ 9	+ 1	+ 1

III.—The south-west monsoon period.—The Bombay monsoon current was weak in June. It was slightly later in being established on the Bombay Coast than usual, but advanced rapidly into Upper India for a brief period and withdrew in the last week of the month. The Bombay monsoon current was abnormally feeble during the remainder of the period and the rainfall was very greatly below the normal over the region which usually obtains rain from it, the drought intensifying with the advance of the season. The Bay current was of normal strength from June to August and fell slightly below its normal strength in September.

The humidity conditions of the period were determined

by their variations in the strength and rain-giving capacity of the monsoon currents.

The following is a brief statement of the chief features of the mean humidity conditions of the whole period:—

(1) The variations of the humidity conditions were generally small in amount throughout the period in Burma and North-Eastern India, as shown below:—

AREA.	VARIATION OF MEAN ABSOLUTE HUMIDITY FROM NORMAL IN					VARIATION OF MEAN RELATIVE HUMIDITY FROM NORMAL IN				
	June.	July.	August.	September.	Period June to September.	June.	July.	August.	September.	Period June to September.
Burma . . .	+ '003	+ '011	+ '024	+ '017	+ '014	0	- 1	0	- 1	- 1
Bengal . . .	- '002	- '001	+ '024	+ '011	+ '038	0	0	- 2	- 3	- 1
Orissa . . .	+ '026	- '014	+ '066	+ '022	+ '032	+ 4	+ 1	+ 1	- 3	+ 1
Chota Nagpur . .	- '024	- '020	- '001	- '090	- '037	- 1	0	- 5	- 18	- 6
Bihar . . .	+ '029	+ '025	+ '035	+ '027	+ '029	+ 4	+ 6	+ 1	0	+ 3

(2) Over nearly the whole of the remainder of India including the Punjab, North-Western Provinces, Rajputana, Central India, Berar, the Central Provinces, North Bombay, Konkan and the Deccan, the air was on the mean of the period abnormally dry. The variations were slight and unimportant in June but were large during the remainder of the period, increasing in amount throughout. The amount of aqueous vapour present in the air was much less than usual. This in combination with the increased temperature due to decreased cloud and rainfall reduced the relative humidity very largely below the normal over the interior districts. The following gives comparative aqueous vapour pressure data for this period in this area of abnormal dryness:—

AREA.	VARIATION OF MEAN ABSOLUTE HUMIDITY FROM NORMAL IN					VARIATION OF MEAN RELATIVE HUMIDITY FROM NORMAL IN				
	June.	July.	August.	September.	Period June to September.	June.	July.	August.	September.	Period June to September.
Baluchistan (Quetta).	- '025	- '160	- '074	- '030	- '077	- 4	- 16	- 10	- 7	- 9
Punjab . . .	+ '006	- '022	- '102	- '186	- '076	+ 1	- 4	- 12	- 19	- 9
Rajputana . . .	- '025	- '099	- '115	- '111	- '090	+ 1	- 13	- 24	- 17	- 13
Sind . . .	+ '008	+ '044	+ '024	- '003	+ '018	- 2	+ 2	- 2	- 2	- 1
North-Western Provinces.	- '032	- '018	- '027	- '135	- '083	+ 3	+ 5	- 9	- 17	- 5
Bejar . . .	- '019	- '085	- '087	- '133	- '081	- 2	- 13	- 17	- 22	- 14
Central Provinces	- '037	- '052	- '067	- '134	- '075	- 5	- 9	- 14	- 22	- 13
Konkan . . .	- '043	- '039	- '036	- '035	- '038	- 2	- 8	- 7	- 5	- 6
Bombay Deccan.	- '022	- '048	- '053	- '029	- '038	- 1	- 8	- 10	- 6	- 6
Madras Deccan . .	- '130	- '130	- '117	- '088	- '116	- 11	- 15	- 13	- 8	- 12

The variations of the humidity conditions from the normal were largest in Berar, the Central Provinces, Central India, Rajputana and the South and East Punjab.

The following gives comparative data for representative stations in these areas :—

STATION.	VARIATION OF ABSOLUTE HUMIDITY FROM NORMAL IN					VARIATION OF RELATIVE HUMIDITY FROM NORMAL IN				
	June.	July.	August.	September.	Period June to September.	June.	July.	August.	September.	Period June to September.
Buldana .	—'039	—'097	—'102	—'135	—'093	—3	—14	—18	—22	—14
Akola .	+ '001	—'073	—'071	—'130	—'068	0	—12	—15	—22	—12
Khandwa .	—'045	—'064	—'083	—'154	—'087	—5	—9	—17	—24	—14
Nagpur .	—'029	—'060	—'051	—'113	—'063	—4	—9	—19	—19	—11
Deesa .	—'032	—'122	—'145	—'129	—'107	—1	—17	—22	—16	—14
Jaipur .	—'017	—'075	—'104	—'093	—'072	+2	—9	—25	—17	—12
Ludhiana .	—'064	—'040	—'115	—'253	—'118	—4	—5	—10	—27	—13
Lahore .	+ '053	—'004	—'106	—'205	—'064	+7	—3	—12	—18	—7

IV.—The retreating south-west monsoon period.—The humidity conditions of this period were almost solely determined by the failure of the rains over the greater part of India during the previous three months. In the drought area including the South Punjab, Rajputana, Central India, Berar, the Central Provinces, the Deccan and Mysore the air was excessively and abnormally dry, the only year comparable in this respect being the corresponding period of the year 1896. The rains ceased in North-Eastern India in the fourth week of September and in Burma in the second week of November. Moderate to heavy rain fell in North-Eastern India in October due to two cyclonic storms. The regular rains ceased on the 25th of September. The interior of the Peninsula, more especially the Deccan, received very scanty rain during the period, thus emphasizing the previously established drought conditions. The rainfall of the retreating south-west monsoon was chiefly determined to the coast districts of the south of the Peninsula in November and the first week of December.

(1) The chief feature of the period was the abnormal dryness of the air over the whole of North-Western and Central India and the north and centre of the Peninsula. The following gives comparative data :—

AREA.	VARIATION OF MEAN ABSOLUTE HUMIDITY FROM NORMAL IN				VARIATION OF MEAN RELATIVE HUMIDITY FROM NORMAL IN			
	October.	November.	December.	Period October to December.	October.	November.	December.	Period October to December.
Chota Nagpur.	—'086	—'088	—'051	—'075	—12	—14	—12	—13
Punjab .	—'126	—'035	—'023	—'091	—13	—10	—14	—12
Sind .	—'044	+ '028	+ '064	+ '016	—6	—1	+ 2	—2
Rajputana .	—'152	—'047	—'026	—'075	—19	—12	—10	—14
Berar .	—'256	—'198	—'110	—'188	—34	—30	—23	—29
Central Provinces.	—'198	—'146	—'092	—'145	—27	—24	—20	—24
Bombay Deccan.	—'101	—'148	—'132	—'127	—15	—16	—16	—16
Konkan .	—'008	—'034	—'065	—'036	—6	—3	—7	—5
Madras Deccan.	—'107	—'148	—'116	—'124	—13	—18	—14	—15
Mysore .	—'004	—'146	—'103	—'084	—4	—17	—13	—11

The deficiency was throughout most marked in the area including Berar, the Central Provinces, the Bombay and Madras Deccan and Hyderabad. Comparative data are given below for the stations at which the deficiency was greatest :—

STATION.	VARIATION OF ABSOLUTE HUMIDITY FROM NORMAL IN				VARIATION OF RELATIVE HUMIDITY FROM NORMAL IN			
	October.	November.	December.	Period October to December.	October.	November.	December.	Period October to December.
Khandwa .	—'217	—'156	—'113	—'162	—30	—25	—23	—26
Akola .	—'244	—'169	—'075	—'163	—32	—27	—21	—27
Buldana .	—'268	—'226	—'144	—'213	—36	—32	—25	—31
Nagpur .	—'178	—'135	—'071	—'128	—23	—22	—16	—20
Sholapur .	—'174	—'217	—'163	—'185	—26	—27	—22	—25
Hyderabad (Deccan), Bellary .	—'138	—'147	—'107	—'131	—21	—21	—17	—20
Bellary .	—'107	—'148	—'116	—'124	—13	—18	—14	—15
Bangalore .	—'015	—'137	—'105	—'086	—5	—16	—12	—11

As already stated the excessive dryness in this central area was very similar to the conditions which obtained in

the same drought area in the year 1896 (but much more strongly pronounced), as shown below:—

STATION.	MEAN OF RETREATING SOUTH-WEST MONSOON PERIOD, OCTOBER TO DECEMBER.			
	1899.		1896.	
	VARIATION FROM NORMAL.		VARIATION FROM NORMAL.	
	Absolute humidity.	Relative humidity.	Absolute humidity.	Relative humidity.
Khandwa . . .	—'162	—26	—'040	—12
Akola . . .	—'163	—27	—'040	—13
Buldana . . .	—'213	—31	—'076	—14
Nagpur . . .	—'128	—20	+ '031	—2
Sholapur . . .	—'185	—25	?	?
Hyderabad (Deccan) .	—'131	—20	—'016	—7
Bellary . . .	—'124	—15	—'061	—11
Bangalore . . .	—'086	—11	—'005	—4

(2) The air was slightly drier throughout the period in the southern half of the Peninsula (to the south of Lat. 14° N) and in North Madras:—

AREA.	VARIATION OF MEAN ABSOLUTE HUMIDITY FROM NORMAL IN				VARIATION OF MEAN RELATIVE HUMIDITY FROM NORMAL IN			
	October.	November.	December.	Period October to December.	October.	November.	December.	Period October to December.
Madras Coast .	+ '006	—'067	—'047	—'036	+1	—6	—3	—3
South India .	+ '005	—'068	—'089	—'051	—1	—10	—11	—7

(3) The air was much drier than usual at almost all the hill stations in Northern India throughout the period as is shown by the following data:—

STATION.	VARIATION OF ABSOLUTE HUMIDITY FROM NORMAL IN				VARIATION OF RELATIVE HUMIDITY FROM NORMAL IN			
	October.	November.	December.	Period October to December.	October.	November.	December.	Period October to December.
Leh . . .	+ '005	+ '025	—'019	+ '004	+ 5	+ 9	—15	0
Srinagar . . .	+ '072	+ '044	+ '030	+ '049	+ 2	+ 5	+ 5	+ 4
Simla . . .	—'070	—'032	—'025	—'042	—13	—9	—7	—10
Chakrata . . .	—'089	—'052	—'029	—'057	—20	—16	—12	—16
Ranikhet . . .	—'096	—'061	—'040	—'066	—19	—14	—13	—15
Mount Abu . . .	—'115	—'020	+ '003	—'044	—20	—7	—6	—11

(4) The humidity conditions of the period were practi-

cally normal in Burma and North-Eastern India as shown below:—

AREA.	VARIATION OF MEAN ABSOLUTE HUMIDITY FROM NORMAL IN				VARIATION OF MEAN RELATIVE HUMIDITY FROM NORMAL IN			
	October.	November.	December.	Period October to December.	October.	November.	December.	Period October to December.
Port Blair . . .	+ '031	—'068	—'038	—'025	—1	—2	—1	—1
Burma . . .	+ '012	—'047	—'090	—'042	—4	—3	—8	—5
Bengal . . .	—'016	—'060	—'004	—'027	—1	—3	—1	—2
Orissa . . .	+ '040	—'002	+ '054	+ '031	+ 3	+ 2	+ 2	+ 2
Bihar . . .	+ '028	+ '001	+ '011	+ '013	0	+ 1	+ 2	+ 1

(5) The air contained the normal amount of aqueous vapour in Persia and Baluchistan as is shown by the following statement:—

STATION.	8 A.M. ABSOLUTE HUMIDITY.				
	Actual, October.	Actual, November.	Actual, December.	Mean actual of period November and December.	Variation from normal of period November and December.
Baghdad . . .	"	"	"	"	"
Bushire . . .	'401	'320	'232	'276	—'022
Teheran . . .	'679	'501	'341	'421	—'009
Ispahan . . .	'259	'210	'146	'178	—'004
Muscat . . .	'350	'250	'150	'200	+ '005
Kabul . . .	'701	'671	'578	'625	+ '014
Quetta . . .	'187	'178	?	?	?
	'204	'185	'183	'184	+ '013

Humidity was above the average to a slight extent in that area, as is shown below:—

STATION.	8 A.M. RELATIVE HUMIDITY.				
	Actual, October.	Actual, November.	Actual, December.	Mean actual of period November and December.	Variation from normal of period November and December.
Baghdad . . .	% 52	% 74	% 81	% 78	+1
Bushire . . .	65	74	73	74	+3
Teheran . . .	44	62	64	63	+2
Ispahan . . .	71	85	81	83	+4
Muscat . . .	59	67	67	67	—3
Quetta . . .	48	58	76	67	+9

The year.—The mean variations for the whole year are given in the final columns of the Tables VIII and IX.

The following are the more important features of the humidity conditions of the year 1899 in India :—

1st.—The year was slightly drier than usual. The mean humidity of the whole of India for the year was 5 below the normal. The deficiency in 1899 was partly a result of the high temperature of the year, and partly of a deficiency in the amount of aqueous vapour which on the mean of the year was '026" below the normal. These variations are the largest that have occurred during the past 25 years.

2nd.—The variations of the mean humidity conditions were small to moderate in Burma, North-Eastern India and the frontier districts. The following gives data in illustration :—

AREA.	MEAN VARIATION FROM NORMAL IN 1899 OF	
	Mean absolute humidity.	Mean relative humidity.
Burma	—'003	+1
Bengal	0	—1
Orissa	+ '032	+1
Bihar	+ '019	+2
Chota Nagpur	—'021	—5

3rd.—On the mean of the year the aqueous vapour pressure and humidity were in large defect over by far the greater part of the area wholly dependent on the Bombay current for its south-west monsoon rainfall, including the Punjab, Rajputana, Central India, Berar, North Bombay, the Central Provinces and Deccan. The mean humidity of the year was normal in three of the divisions given in Table XI and 3 or upwards below the normal in the areas for which variation data are given below :—

AREA.	MEAN VARIATION FROM NORMAL IN 1899 OF	
	Mean absolute humidity.	Mean relative humidity.
Baluchistan	—'030	—7
North-West Himalayas	—'008	—3
Punjab Plains	—'050	—8
Gangetic Plain	—'024	—4
Western Rajputana	—'021	—5
Eastern Rajputana and Central India	—'037	—10
Nerbudda Valley	—'096	—15
Chota Nagpur	—'021	—5
Central Provinces (South) and Berar	—'058	—10
Konkan	—'039	—5
Deccan, Hyderabad and Mysore	—'048	—6

The deficiency was most marked in the area represented by the stations for which data are given below :—

STATION.	MEAN VARIATION FROM NORMAL IN 1899 OF	
	Absolute humidity.	Relative humidity.
Ruldana	—'113	—16
Khandwa	—'095	—15
Shelapur	—'081	—11
Akola	—'070	—12
Deesa	—'050	—10

The following gives the mean annual variation of the mean aqueous vapour pressure and humidity of the whole of India from the normal for each year from 1875 to 1899 :—

YEAR.	Annual variation of pressure of vapour.	Annual variation of relative humidity.
1875	—'004	+1
1876	—'017	—1
1877	+ '011	+1
1878	+ '020	0
1879	—'014	—1
1880	—'004	0
1881	+ '001	0
1882	—'008	0
1883	—'013	—1
1884	—'012	0
1885	+ '001	0
1886	+ '008	+1
1887	—'012	—1
1888	—'005	—1
1889	+ '003	—1
1890	—'003	—1
1891	—'007	0
1892	—'002	—1
1893	+ '007	+3
1894	+ '013	+2
1895	+ '003	0
1896	—'010	—3
1897	+ '005	—1
1898	—'008	—2
1899	—'026	—5

Cloud.

Normal values of the mean monthly and annual amount of cloud at second class stations, obtained from the whole of the available data up to the end of the year 1896, were given in Table XXI of the Annual Summary of 1896. These means are the means of the cloud amounts as registered at 10 A.M. and 4 P.M., and hence represent the mean amount during the day period rather than of the whole 24 hours. Corrections to reduce these means to true daily means have only been obtained in the case of a few stations.

Variation data of this element of meteorological observation for the year 1899 are given in Tables XIV, XV and XVI. Table XV gives the mean variation data for the eighteen meteorological areas adopted in the geographical summaries of meteorological data in the Annual Reports previous to 1891, and Table XVI gives similar data for ten meteorological provinces of India.

TABLE XIV.—Comparison of the mean cloud proportion in each month of 1899 with the averages of past years.

METEOROLOGICAL PROVINCE.	STATION.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	YEAR.
BURMA COAST AND BAY ISLANDS.	Port Blair .	+1'0	-1'3	-0'2	+2'2	+0'6	+0'8	+0'2	+0'4	+1'0	+0'2	+0'4	+0'8	+0'5
	Rangoon .	-0'2	-1'1	-1'7	+1'6	+1'6	+0'3	+0'5	+0'5	+0'1	-0'6	-0'8	-1'5	-0'1
	Diamond Is-land.	-0'3	-1'0	-1'9	-0'6	+0'7	-0'2	+0'2	+0'7	+0'6	-0'3	-0'4	-2'0	-0'4
	Cocos Island.	-0'1	-0'6	-1'1	+1'1	+0'4	-1'0	-0'9	-0'2	+0'3	+0'6	+0'6	+0'3	-0'1
	Akyab .	-0'5	+0'7	-0'6	+0'6	+2'6	+0'9	+0'2	-0'3	-0'1	+0'2	+0'7	-1'0	+0'3
BENGAL AND ORISSA.	Chittagong .	-0'4	+0'3	-1'4	0	+1'7	-0'5	-0'4	+0'4	-0'3	-0'4	-1'3	-1'0	-0'3
	Calcutta (Ali- pore).	+0'5	+0'1	-1'5	+1'1	+1'7	+1'5	+0'5	+0'1	-0'4	+0'2	-1'2	-0'4	+0'2
	Saugor Island	+0'6	+1'2	-1'3	+0'1	+1'4	+0'6	+1'0	+0'7	+0'5	+0'5	-0'6	-0'6	+0'3
GANGETIC PLAIN AND CHOTA NAGPUR.	False Point .	+1'3	+2'2	-1'5	+0'9	+0'8	+1'2	+0'3	+0'3	-1'2	-0'3	-1'4	+0'5	+0'3
	Hazaribagh .	0	+0'1	-1'8	+2'3	+3'1	+1'9	+0'7	+0'9	-0'5	-0'5	-2'2	-0'4	+0'3
	Darbhanga .	+0'4	-0'4	-0'9	0	+1'0	+0'5	+0'7	-0'3	-1'8	-0'6	-0'6	-0'6	-0'2
UPPER SUB-HIMALAYAS.	Allahabad .	-0'1	-0'1	-1'3	+0'2	0	+1'4	+1'5	-0'4	-2'0	-1'2	-0'9	-0'6	-0'3
	Dehra Dun .	-0'1	-0'8	-1'0	+0'3	-0'4	+0'6	-0'1	-2'9	-3'6	-0'8	+0'3	-0'3	-0'7
	Roorkee .	-1'8	-0'6	-0'1	-0'7	-0'4	+1'1	-0'5	-4'0	-3'1	-0'6	+0'3	-1'0	-1'0
	Meerut .	-2'0	-1'0	-1'0	+0'2	+3'3	+2'3	+1'3	-1'8	-2'8	-0'3	+0'4	-1'1	-0'2
	Lahore .	-1'8	-0'5	+0'1	-0'5	-1'4	-0'5	-1'8	-2'0	+3'8	+0'2	+1'2	0	-0'3
INDUS VALLEY AND NORTH WEST RAJ-PUTANA.	Ludhiana .	-1'4	-0'7	-0'5	0	-2'0	-0'7	-2'7	-3'2	-2'5	+0'2	+1'5	-0'5	-1
	Peshawar .	-1'7	-3'9	+0'5	-1'4	-0'1	-0'7	-0'4	-0'6	+0'1	+0'6	+1'0	+0'5	-0'5
	Jacobabad .	-1'8	-1'1	+0'1	-1'3	-0'4	+0'2	-2'0	-1'7	-0'6	+0'3	+0'9	+1'3	-0'5
EAST RAJPUTANA, CENTRAL INDIA AND GUJARAT.	Kurrachee .	-1'6	-1'4	-1'4	-1'0	-0'5	-0'9	-1'6	-1'3	-1'4	-0'8	-0'4	+0'2	-1'0
	Jaipur .	-1'5	-0'6	-1'1	-0'1	+0'7	+0'4	-0'6	-3'6	-0'7	-0'6	-0'5	+0'1	-0'7
	Deesa .	-1'7	-1'2	-2'0	-1'4	-1'0	-1'3	-0'4	-2'6	-2'6	-0'9	-1'3	-0'2	-1'4
DECCAN .	Belgaum .	-1'0	+0'4	-0'8	+1'1	+0'1	+0'4	-0'9	-1'5	-0'2	-2'2	-2'6	-1'6	-0'7
	Sholapur .	-1'0	+0'5	-0'6	+0'9	+0'6	+0'8	-0'1	-1'5	-1'1	-2'5	-2'7	-1'7	-0'7
	Poona .	-1'3	+0'3	-1'2	+0'6	+0'7	-0'1	-0'4	-1'8	-1'5	-0'3	-1'3	-0'2	-0'5

TABLE XIV.—Comparison of the mean cloud proportion in each month of 1899 with the averages of past years—concl'd.

METEOROLOGICAL PROVINCE.	STATION.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	YEAR.
DECCAN —concl'd.	Akola . .	-1'1	+0'8	-1'1	+1'6	+0'8	-0'3	-0'3	-1'0	-1'7	-0'9	-1'1	+0'6	-0'3
	Buldana . .	-1'9	+0'1	-1'7	+0'3	-0'7	+0'9	+0'9	-0'6	-2'0	-1'1	-1'6	-0'5	-0'7
	Khandwa . .	-1'3	+0'2	-1'2	+0'6	-0'1	+0'6	+0'6	-0'9	-1'5	-0'5	-1'1	+0'3	-0'4
	Nagpur . .	-0'9	+0'8	-1'0	+1'9	+1'5	0	0	-0'4	-1'4	-1'6	-1'8	-0'3	-0'3
	Hyderabad (Deccan).	-0'4	+0'1	-1'0	+1'3	+0'6	+0'5	-0'3	+0'1	-0'5	-1'4	-1'9	-1'1	-0'3
WEST COAST	Bombay . .	-0'9	+0'3	-1'2	-0'2	-0'5	-0'3	-0'5	-1'8	-2'5	-2'2	-1'6	-0'8	-1'0
	Karwar . .	-0'3	0	+0'4	+1'2	+0'5	-0'1	-1'1	-2'2	-0'3	-0'9	-1'9	-1'1	-0'5
	Salem . .	+0'9	+0'3	-1'2	+1'8	+0'3	+0'4	-0'8	-0'7	+0'3	+1'2	-1'2	-1'2	0
SOUTH INDIA	Chitaldroog . .	+0'6	+0'6	-1'3	+1'6	+0'6	+0'2	-0'5	-1'2	-0'3	-0'7	-2'7	-1'4	-0'4
	Bangalore . .	-0'2	-0'5	-1'3	+1'5	+0'2	+1'6	+0'6	+0'4	+1'0	+0'4	-3'1	-1'7	-0'1
	Hassan . .	+0'2	+1'1	-1'1	+1'1	+0'9	+0'4	-0'7	-1'1	+0'5	+0'4	-3'2	-1'0	-0'2
	Mysore . .	+1'1	+2'0	+0'6	+2'0	+1'8	+1'5	+0'3	+0'2	+0'4	+2'1	-3'2	-0'1	+0'7
	Madras . .	+0'6	0	-0'7	+1'0	+0'4	+0'8	-1'7	+0'3	-0'4	+0'7	-1'2	-0'8	-0'1
	Bellary . .	+1'1	+1'8	+0'2	+3'5	+1'5	+1'1	+0'4	+0'5	+0'5	+0'1	-0'9	-0'6	+0'8
	Cocanada . .	-0'1	-0'1	-0'3	+1'3	0	-0'2	-0'4	-0'1	-0'1	+1'3	+0'2	0	+0'1
	Vizagapatam . .	+1'0	+1'2	-0'8	+1'7	+0'7	+1'6			Observatory closed				
HILL STA- TION, BALU- CHISTAN.	Quetta . .	-1'2	+0'7	+0'6	-0'5	+0'6	+0'1	-0'7	-0'1	-0'1	+0'6	+1'8	+2'0	+0'3
	Leh . .	-1'1	-0'8	-0'4	+0'8	-1'1	-1'0	-0'8	-0'8	-0'7	-0'3	+0'8	+0'1	-0'4
	Srinagar . .	-0'4	+1'4	-0'1	+1'0	+0'4	-1'4	-0'2	-0'7	-0'7	-0'4	+1'8	-0'1	+0'1
	Kailang . .	-0'7	-0'6	+0'5	+0'7	+0'1	-0'3	-0'2	-1'0	+0'1	+0'2	+1'3	+0'7	+0'1
HILL STA- TIONS, NOR- THERN IN- DIA.	Simla (Ridge) . .	-1'3	-0'7	+0'1	+0'2	-0'8	-0'6	+0'3	-2'2	-4'1	-0'7	+1'1	-0'6	-0'8
	Chakrata . .	-0'8	-0'5	-0'6	0	-0'3	+0'8	+1'0	-1'3	-3'6	-0'9	+0'4	-0'5	-0'5
	Ranikhet . .	-0'7	-1'0	-1'4	-0'5	-0'7	+0'4	+0'4	-1'8	-3'5	-1'1	+0'1	-0'8	-0'9
	Katmandu . .	-0'4	-0'6	-1'8	-1'3	-0'9	+0'4	+0'8	+0'2	-0'5	-0'9	+0'6	-0'9	-0'4
	Darjeeling . .	+0'1	+0'7	+0'5	-1'4	-0'9	+1'1	+0'8	+0'1	-0'2	-0'1	-0'3	-0'3	0
HILL STA- TIONS, CENTRAL INDIA.	Mount Abu . .	-1'8	-1'6	-2'0	-0'9	-0'8	-0'7	-0'6	-2'2	-2'0	-0'7	-1'2	+0'3	-1'2
	Pachmarhi . .	-1'1	+0'2	-1'1	+1'3	+1'3	+0'8	-0'1	-1'1	-2'8	-1'3	-1'4	0	-0'4
	Chikalda . .	-1'7	-0'1	-1'6	+1'2	+1'1	-0'1	-1'5	-2'0	-2'6	-1'7	-1'9	-1'1	-1'0
HILL STA- TION, SOUTH INDIA.	Wellington . .	0	-0'2	-1'5	+1'8	0	+0'3	-1'1	-0'3	+0'4	+1'2	-2'7	-2'1	-0'4
EXTRA INDIA	Aden . .	+1'2	+1'0	-0'4	+0'1	+1'6	+3'0	+1'1	+1'6	+0'6	0	+1'1	+0'6	+1'0
	Perim . .	+0'4	+1'3	-0'2	-0'4	+0'2	+0'9	+0'4	+1'1	+0'6	+0'4	+1'6	+0'6	+0'6
	Zanzibar . .	+1'2	+1'3	+1'4	+1'4	+1'7	+0'9	+2'3	+0'8	-0'8	+0'7	-1'2	+2'4	+1'0
	Port Victoria (Seychelles).	0	-1'1	-1'2	-0'6	+0'5	-1'4	-0'3	-0'5	-0'1	-0'2	-1'1	-0'5	-0'5

TABLE XV.—*Geographical summary of the cloud data of Table II in the monthly weather reviews of 1899.*

METEOROLOGICAL AREA.	Number of stations.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	YEAR.
North-West Himalayas	6	—0·8	—0·4	—0·3	+0·4	—0·4	—0·4	+0·1	—1·3	—2·1	—0·5	+0·9	—0·2	—0·4
Sikkim Himalaya and Nepal.	2	—0·2	+0·1	—0·7	—1·4	—0·9	+0·8	+0·8	+0·2	—0·4	—0·5	+0·2	—0·6	—0·2
Punjab Plains . .	3	—1·6	—1·7	0	—0·6	—1·2	—0·6	—1·6	—1·9	+0·5	+0·3	+1·2	0	—0·6
Gangetic Plain . .	5	—0·7	—0·6	—0·9	0	+0·7	+1·2	+0·6	—1·9	—2·7	—0·7	—0·1	—0·7	—0·5
Western Rajputana .	4	—1·7	—1·3	—1·3	—1·2	—0·7	—0·7	—1·2	—2·0	—1·7	—0·5	—0·5	+0·4	—1·0
Eastern Rajputana and Central India.	1	—1·5	—0·6	—1·1	—0·1	+0·7	+0·4	—0·6	—3·6	—0·7	—0·6	—0·5	+0·1	—0·7
Nerbudda Valley .	1	—1·3	+0·2	—1·2	+0·6	—0·1	+0·6	+0·6	—0·9	—1·5	—0·5	—1·1	+0·3	—0·4
Chota Nagpur . .	1	0	+0·1	—1·8	+2·3	+3·1	+1·9	+0·7	+0·9	—0·5	—0·5	—2·2	—0·4	+0·3
Lower Bengal . .	2	+0·6	+0·7	—1·4	+0·6	+1·6	+1·1	+0·8	+0·4	+0·1	+0·4	—0·9	—0·5	+0·3
Orissa	1	+1·3	+2·2	—1·5	+0·9	+0·8	+1·2	+0·3	+0·3	—1·2	—0·3	—1·4	+0·5	+0·3
Central Provinces (South) and Berar	5	—1·3	+0·4	—1·3	+1·3	+0·8	+0·3	—0·2	—1·0	—2·1	—1·3	—1·6	—0·3	—0·5
Konkan	2	—0·6	+0·2	—0·4	+0·5	0	—0·2	—0·8	—2·0	—1·4	—1·6	—1·8	—1·0	—0·8
Deccan, Hyderabad and Mysore.	9	—0·1	+0·7	—0·7	+1·5	+0·8	+0·7	—0·2	—0·7	—0·1	—0·5	—2·4	—1·0	—0·2
East Coast and Carnatic	3-4	+0·6	+0·4	—0·8	+1·5	+0·4	+0·7	—1·0	—0·2	—0·1	+1·1	—0·7	—0·7	+0·1
Arakan and Pegu .	4	—0·4	—0·3	—1·4	+0·4	+1·7	+0·1	+0·1	+0·3	+0·1	—0·3	—0·5	—1·4	—0·1
Bay Islands . .	2	+0·5	—1·0	—0·7	+1·7	+0·5	—0·1	—0·4	+0·1	+0·7	+0·4	+0·5	+0·6	+0·2
Extra-Tropical India	25-26	—0·8	—0·5	—0·8	—0·1	0	+0·3	—0·1	—1·3	—1·4	—0·4	0	—0·2	—0·4
Tropical India . .	26-27	—0·3	+0·2	—0·9	+1·2	+0·7	+0·4	—0·3	—0·6	—0·5	—0·4	—1·5	—0·8	—0·2
Whole India . .	51-53	—0·5	—0·1	—0·9	+0·6	+0·4	+0·3	—0·2	—0·9	—0·8	—0·4	—0·7	—0·5	—0·3

TABLE XVI.—*Variations of the mean cloud amount from the normal in 1899 in nine meteorological provinces of India.*

Meteorological Province.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	YEAR.
Burma Coast and Bay Islands	0	—0·7	—1·1	+1·0	+1·4	+0·2	+0·3	+0·3	+0·4	—0·1	0	—0·9	+0·1
Bengal and Orissa . .	+0·5	+1·0	—1·4	+0·5	+1·4	+0·7	+0·4	+0·4	—0·4	0	—1·1	—0·4	+0·1
Gangetic Plain and Chota Nagpur.	+0·1	—0·1	—1·3	+0·8	+1·4	+1·3	+1·0	—0·1	—1·4	—0·8	—1·2	—0·5	—0·1
Upper Sub-Himalayas . .	—1·4	—0·7	—0·5	—0·1	—0·2	+0·6	—0·8	—2·8	—1·6	—0·3	+0·7	—0·6	—0·6
Indus Valley and North-West Rajputana.	—1·7	—2·1	—0·3	—1·2	—0·3	—0·5	—1·3	—1·2	—0·6	0	+0·5	+0·7	—0·7
East Rajputana, Central India and Gujarat.	—1·6	—0·9	—1·6	—0·8	—0·2	—0·5	—0·5	—3·1	—1·7	—0·8	—0·9	—0·1	—1·1
Deccan	—1·1	+0·4	—1·1	+1·0	+0·4	+0·4	—0·1	—1·0	—1·2	—1·3	—1·8	—0·6	—0·5
West Coast	—0·6	+0·2	—0·4	+0·5	0	—0·2	—0·8	—2·0	—1·4	—1·6	—1·8	—1·0	—0·8
South India	+0·6	+0·7	—0·7	+1·7	+0·7	+0·8	—0·4	—0·3	+0·2	+0·7	—1·9	—0·9	+0·1

I.—The cold weather period.—Weather was less disturbed than usual in January. A large number of depressions affected the weather in North-Western India in February. They were, however, very feeble and gave rise to much less development of cloud than generally occurs in the cold weather. There was hence less cloud than usual in the whole of North-Western and Central India and also in Lower Burma. Cloud was normal on the mean of the period in Bihar. The following gives data for the areas of decreased cloud in the cold weather and also for Bihar:—

AREA.	VARIATION OF MEAN CLOUD AMOUNT FROM NORMAL IN		
	January.	February.	Period January and February.
Punjab	—1'6	—1'7	—1'7
Sind	—1'7	—1'3	—1'5
Rajputana	—1'6	—0'9	—1'3
North-Western Provinces	—1'0	—0'6	—0'8
Bihar	+0'4	—0'4	•
Burma (Lower)	—0'3	—1'1	—0'7

The deficiency was as marked at the hill stations in Northern India as in the neighbouring plains, as shown below:—

STATION.	VARIATION OF CLOUD AMOUNT FROM NORMAL IN		
	January.	February.	Period January and February.
Leh	—1'1	—0'8	—1'0
Kailang	—0'7	—0'6	—0'7
Simla	—1'3	—0'7	—1'0
Ranikhet	—0'7	—1'0	—0'9
Mount Abu	—1'3	—1'6	—1'7

The decreased cloud amount was on the whole most marked in the North and East Punjab and the north-west districts of the North-Western Provinces at the stations for which data are given below:—

STATION.	VARIATION OF CLOUD AMOUNT FROM NORMAL IN		
	January.	February.	Period January and February.
Peshawar	—1'7	—3'9	—2'8
Lahore	—1'8	—0'5	—1'2
Roorkee	—1'8	—0'6	—1'2
Meerut	—2'0	—1'0	—1'5

The amount of cloud was slightly greater than usual in the southern half of the Peninsula, Ganjam, Orissa and Bengal, as shown below:—

AREA.	VARIATION OF MEAN CLOUD AMOUNT FROM NORMAL IN		
	January.	February.	Period January and February.
Mysore	+0'4	+0'8	+0'6
South India	+0'9	+0'3	+0'6
Madras (Central)	+1'1	+1'8	+1'5
Orissa	+1'3	+2'2	+1'8
Bengal	+0'2	+0'5	+0'4
Ganjam	+1'0	+1'2	+1'1

The excess was moderately large in the areas represented by the stations for which data are given below:—

STATION.	VARIATION OF CLOUD AMOUNT FROM NORMAL IN		
	January.	February.	Period January and February.
Vizagapatam	+1'0	+1'2	+1'1
False Point	+1'3	+2'2	+1'8
Saugor Island	+0'6	+1'2	+0'9
Bellary	+1'1	+1'8	+1'5
Mysore	+1'1	+2'0	+1'6
Hassan	+0'2	+1'1	+0'7

Over the remainder of India the variations were small in amount due to the fact that they were opposite in character in the two months. The following gives data for that area:—

AREA.	VARIATION OF MEAN CLOUD AMOUNT FROM NORMAL IN		
	January.	February.	Period January and February.
Central Provinces	—1'1	+0'5	—0'3
Berar	—1'5	+0'5	—0'5
Bombay Deccan	—1'1	+0'4	—0'4
Hyderabad	—0'4	+0'1	—0'2
Konkan	—0'6	+0'2	—0'2

II.—The hot weather period.—March and May were very dry months in North-Western India, and there was hence much less cloud than usual. Weather in April was more disturbed than usual in North-Eastern India and the Peninsula. Cloud was in marked excess in that month as well as in May in those two areas, due to the large influx of local sea winds.

The following is a summary of the chief abnormal features of the distribution of cloud during this season:—

(1) There was less cloud than usual during the period in Upper India. The following gives data:—

AREA.	VARIATION OF MEAN CLOUD AMOUNT FROM NORMAL IN			
	March.	April.	May.	Period March to May.
Punjab	0	—0'6	—1'2	—0'6
Sind	—0'7	—1'2	—0'5	—0'8
Rajputana	—1'6	—0'8	—0'2	—0'9

The variations in the amount of cloud at the hill stations in Upper India were generally similar to those in the adjacent plains, but were small on the mean of the period:—

STATION.	VARIATION OF CLOUD AMOUNT FROM NORMAL IN			
	March.	April.	May.	Period March to May.
Quetta	+0'6	—0'5	+0'6	+0'2
Leh	—0'4	+0'8	—1'1	—0'2
Kailang	+0'5	+0'7	+0'1	+0'4
Srinagar	—0'1	+1'0	+0'4	+0'4
Simla	+0'1	+0'2	—0'8?	—0'2?
Chakrata	—0'6	0	—0'3	—0'3
Ranikhet	—1'4	—0'5	—0'7	—0'9

(2) Cloud was in moderate to considerable defect in March over the remainder of India, but was more or less in excess in April and May.

The following gives data:—

AREA.	VARIATION OF MEAN CLOUD AMOUNT FROM NORMAL IN			
	March.	April.	May.	Period March to May.
North-Western Provinces	—0'9	0	+0'5	—0'1
Bihar	—0'9	0	+1'0	0
Chota Nagpur	—1'8	+2'3	+3'1	+1'2
Bengal	—1'4	+0'4	+1'6	+0'2
Orissa	—1'5	+0'9	+0'8	+0'1
Burma	—1'4	+0'5	+1'6	+0'2
Berar	—1'4	+1'0	+0'1	—0'1
Central Provinces	—1'1	+1'3	+0'7	+0'3
Bombay Deccan	—0'9	+0'9	+0'5	+0'2
West Coast	—0'4	+0'5	0	0
Madras Deccan	—0'4	+3'5	+1'1	+1'4
Madras Coast	—0'6	+1'3	+0'4	+0'4

(3) Cloud was in large excess in the south-east of the Bay, as represented by Port Blair in April, and was about normal in March and May, as shown below:—

STATION.	VARIATION OF CLOUD AMOUNT FROM NORMAL IN			
	March.	April.	May.	Period March to May.
Port Blair	—0'2	+2'2	+0'6	+0'9

III.—The south-west monsoon period.—The variations in the distribution of cloud from the normal during this period were very strongly marked. The south-west monsoon currents advanced over the Arabian Sea and Bay of Bengal about the normal time and extended over the interior of India more rapidly than usual. There was hence more cloud than usual in June over nearly the whole of the interior of Northern and Central India and the Bay, but less in the West Coast districts. The Bombay current fell off rapidly in strength during the last week of June, and was extremely feeble as a rain-giving current during the remainder of the period. Cloud was hence below the normal to a marked extent from July to September over the whole area dominated by the Bombay current.

The Bay current was of full strength in July, but decreased in vigour in August and September and was determined more to the east than usual. Cloud was hence in large excess in North-Eastern India in July and in slight excess in August. In September cloud was in defect in that area as over the remainder of India.

The following gives the chief features of the cloud distribution and its variations from the normal during the period :—

- (1) Cloud was in slight defect in the West Coast districts and in the Punjab in June, as shown below :—

AREA OR STATION.	MEAN CLOUD AMOUNT.		
	Actual, June.	Normal, June.	Variation from normal.
Kurrachee	3'4	4'3	-0'9
Bombay	7'5	7'8	-0'3
Karwar	7'0	7'1	-0'1
Punjab	2'2	2'8	-0'6

- (2) Cloud was in slight to moderate excess over the remainder of India in June. The following gives data in illustration :—

AREA.	MEAN CLOUD AMOUNT.		
	Actual, June.	Normal, June.	Variation from normal.
Burma	8'4	8'1	+0'3
Bengal	8'0	7'5	+0'5
Bihar	5'2	4'7	+0'5
North-Western-Provinces	5'3	3'9	+1'4
Central Provinces	6'9	6'6	+0'3
Berar	6'8	6'5	+0'3
Deccan	7'8	7'3	+0'5
South India	6'4	6'0	+0'4

- (3) Cloud was in marked defect over the whole area usually dependent upon the Bombay current from July to September. The following gives variation data of this area for this period :—

AREA.	VARIATION OF MEAN CLOUD AMOUNT FROM NORMAL IN			MEAN OF PERIOD JULY TO SEPTEMBER	
	July.	August.	September.	Actual.	Variation from normal.
Punjab	-1'6	-1'9	+0'5	2'5	-1'0
Sind	-1'8	-1'5	-1'0	2'3	-1'4
Rajputana	-0'5	-3'1	-1'7	4'9	-1'8
Berar	+0'3	-0'8	-1'9	6'9	-0'8
Central Provinces	+0'3	-0'7	-1'5	7'0	-0'6
West Coast	-0'8	-2'0	-1'4	6'3	-1'4
Deccan	-0'3	-0'8	-0'6	7'4	-0'6
South India	-0'8	-0'7	+0'3	5'7	-0'4

The area of greatest deficiency included Rajputana, Sind and the South Punjab in July and August and was transferred to South-West Rajputana, North Bombay, Khandesh and Berar in September.

- (4) Cloud was in slight excess on the mean of the period in Bengal, Chota Nagpur and Burma, and also in the Andamans, due to increased cloud in July and August. It was, on the other hand, in slight to moderate defect in the North-Western Provinces, Bihar and Orissa :—

AREA.	VARIATION OF MEAN CLOUD AMOUNT FROM NORMAL IN			
	July.	August.	September.	Period July to September.
North-Western-Provinces	+0'6	-2'3	-2'9	-1'5
Bihar	+0'7	-0'3	-1'8	-0'5
Chota Nagpur	+0'7	+0'9	-0'5	+0'4
Bengal	+0'4	+0'4	-0'1	+0'2
Orissa	+0'3	+0'3	-1'2	-0'2
Burma	+0'3	+0'3	+0'2	+0'3
Port Blair	+0'2	+0'4	+1'0	+0'5

- (5) The decreased cloud amount was very strongly marked at the hill stations in the North-Western Himalayas in August and September, more especially in the latter month, which was an exceptionally fine month at most of these hills districts and the cloud

amount smaller than in the corresponding months of the past 25 years. The following gives data :—

STATION.	VARIATION OF CLOUD AMOUNT FROM NORMAL IN			MEAN OF PERIOD JULY TO SEPTEMBER.	
	July.	August.	September.	Actual.	Variation from normal.
Leh	-0'8	-0'8	-0'7	3'4	-0'8
Kailang	-0'2	-1'0	+0'1	4'9	-0'4
Simla	+0'3	-2'2	-4'1	1'7	-2'0
Chakrata	+1'0	-1'3	-3'6	2'7	-1'3
Ranikhet	+0'4	-1'8	-3'5	2'5	-1'6

The following gives the mean actual cloud amount at these stations, month by month, during the period :—

STATION.	ACTUAL CLOUD AMOUNT IN			Mean of period July to September.
	July.	August.	September.	
Leh	4'3	4'4	3'4	4'0
Kailang	6'2	5'5	4'9	5'5
Simla	9'1	6'7	1'7	5'8
Chakrata	9'4	7'3	2'7	6'5
Ranikhet	8'9	6'9	2'5	6'1

IV.—The retreating monsoon period.—The south-west monsoon currents retreated slightly earlier than usual from North-East India and considerably earlier from the Deccan. From the fourth week of October the retreating monsoon current was chiefly determined to the south-west of the Bay and Southern India, and withdrew from the Bay in the fourth week of November, or the first week of December, and hence considerably earlier than usual. A large number of feeble depressions appeared in the Persian area and Upper India during the period, but were generally rainless in the Punjab plains, although they gave frequent cloud. Weather was very disturbed, with much cloud, in the Punjab plains and with heavy rain or snow in the hills during the last week of December. The following gives the chief features of the amount of cloud during the period :—

(1) Cloud was throughout the period in slight to considerable excess in Baluchistan and Upper India, as shown below :—

AREA.	VARIATION OF MEAN CLOUD AMOUNT FROM NORMAL IN			
	October.	November.	December.	Period October to December.
Baluchistan (Quetta) .	+0'6	+1'8	+2'0	+1'5
Sind	-0'3	+0'3	+0'8	+0'3
Punjab	+0'3	+1'2	0	+0'5

(2) The variations in the hill districts in Upper India were, on the whole, similar to those of the adjacent plains, but less pronounced, as is shown by the following data :—

STATION.	VARIATION OF CLOUD AMOUNT FROM NORMAL IN			
	October.	November.	December.	Period October to December.
Leh	-0'3	+0'8	+0'1	+0'2
Simla	-0'7	+1'1	-0'6	-0'1
Chakrata	-0'9	+0'4	-0'5	-0'3
Ranikhet	-1'1	+0'1	-0'8	-0'6
Mount Abu	-0'7	-1'2	+0'3	-0'5

(3) Cloud was in persistent defect throughout the whole period over the remainder of India excepting Southern India and the Madras coast districts.

The following gives comparative data :—

AREA.	VARIATION OF MEAN CLOUD AMOUNT FROM NORMAL IN			
	October.	November.	December.	Period October to December.
Burma	-0'2	-0'2	-1'5	-0'6
Bengal	+0'1	-1'0	-0'7	-0'5
Bihar	-0'6	-0'6	-0'6	-0'6
Chota Nagpur	-0'5	-2'2	-0'4	-1'0
North-Western Provinces.	-0'7	0	-0'8	-0'5
Rajputana	-0'8	-0'9	-0'1	-0'6
Central Provinces	-1'1	-1'5	0	-0'9
Berar	-1'0	-1'4	+0'1	-0'8
Bombay Deccan	-1'7	-2'2	-1'2	-1'7
Madras Deccan	+0'1	-0'9	-0'6	-0'5
Konkan	-1'6	-1'8	-1'0	-1'5

The deficiency was most marked at stations in the area for which data are given below :—

STATION.	VARIATION OF CLOUD AMOUNT FROM NORMAL IN			
	October.	November.	December.	Period October to December.
Bombay	-2'2	-1'6	-0'8	-1'5
Nagpur	-1'6	-1'8	-0'3	-1'2
Sholapur	-2'5	-2'7	-1'7	-2'3
Belgaum	-2'2	-2'6	-1'6	-2'1
Hyderabad (Deccan) . .	-1'4	-1'9	-1'1	-1'5

(4) There was more cloud than usual in Southern India and the Madras coast districts in October, but less in November and December. Cloud was throughout in excess at Port Blair, as is shown by the following data :—

AREA OR STATION.	VARIATION OF MEAN CLOUD AMOUNT FROM NORMAL IN			
	October.	November.	December.	Period October to December.
Port Blair	+0'2	+0'4	+0'8	+0'5
Madras Coast	+1'0	-0'5	-0'4	0
Mysore	+0'6	-3'1	-1'1	-1'2
South India	+1'2	-1'2	-1'2	-0'4

(5) Cloud was considerably above the normal in Persia and slightly above in Arabia, as is shown below :—

STATION.	VARIATION OF CLOUD AMOUNT FROM NORMAL IN			
	October.	November.	December.	Period October to December.
Baghdad	+2'0	+1'5	+1'9	+1'8
Bushire	+0'1	+3'3	+1'6	+1'7
Aden	0	+1'1	+0'6	+0'6
Muscat	+0'3	-0'8	+1'9	+0'5

The year.—The mean cloud amount of the year in India was 0'3 below the normal. The variations in Tropical India and Extra-Tropical India and also of the whole of India for each of the four periods of the year are given below :—

AREA.	VARIATION OF MEAN CLOUD AMOUNT FROM NORMAL IN				
	I. Period.	II. Period.	III. Period.	IV. Period.	Whole year.
Extra-Tropical India .	-0'7	-0'3	-0'6	-0'2	-0'4
Tropical India . . .	-0'1	+0'3	-0'3	-0'9	-0'2
Whole India	-0'3	0	-0'4	-0'5	-0'3

The following table gives the variation of the mean amount of cloud in the Indian area, year by year, from 1875 to 1899 :—

YEAR.	Amount of variation.	YEAR.	Amount of variation.
1875	0	1888	-0'1
1876	-0'2	1889	+0'1
1877	+0'3	1890	+0'2
1878	+0'1	1891	+0'1
1879	-0'1	1892	+0'1
1880	-0'1	1893	+0'5
1881	-0'1	1894	+0'5
1882	0	1895	+0'1
1883	+0'1	1896	-0'2
1884	-0'1	1897	0
1885	+0'2	1898	-0'2
1886	+0'2	1899	-0'3
1887	-0'1		

Rainfall.

The rainfall data of India are now issued in a separate volume. The ninth volume, that of 1899, contains the rainfall data of 2,288 stations, which are classified under their respective administrative divisions according to the following scheme :—

PROVINCE.	Number of stations.
Burma	147
Assam	115
Bengal, Bihar, Chota Nagpur and Orissa	350
North-Western Provinces and Oudh	279
Punjab	211
Bombay	278
Madras	370
Coorg	10
Central Provinces	66
Berar	44
Mysore	78
Baluchistan	48
Kashmir	21
Rajputana	134
Central India	61
Hyderabad (Deccan)	23
Travancore	39
Cochin	3
Pudukota	11

The volume contains the whole of the available information for the year 1899 of this important element of meteorological observation.

The information includes monthly statements of—

- (a) the actual rainfall, day by day, of all the rainfall stations;
- (b) the total rainfall of the month;
- (c) the number of rainy days during the month;
- (d) the average or normal rainfall of the month for all stations for which rainfall data of at least five years are available;
- (e) the average or normal number of rainy days of the month for all stations for which rainfall data of five years or upwards are available;
- (f) the accumulated rainfall (up to the date of each statement) throughout each of the seasons into which the year is divided.

Symons's rain-gauges are now used at all rain-gauge stations, with the exception of those in Mysore. The hour of measuring rainfall is 8 A.M. throughout India, and the amounts registered give the rainfall of the previous 24 hours, and hence generally of the previous civil day.

In Table XXV of the Annual Summary for 1896 are given the normal means of rainfall for 535 stations determined from the whole of the available data down to December 1896. The stations for which the means are given were selected by Mr. Blanford, and normal means were given in the rainfall sections of the Annual Reports on the Meteorology of India. The last series of means was given in the Annual Report on the Meteorology of India for 1890. The normal means in Table XXV of the Annual Summary for 1896 are based on six years' additional data. This period, however, includes the three years 1892-94 of abnormally heavy rainfall, and hence the means given in this table are in almost all cases higher than those given in Table XXXI of the Annual Report on the Meteorology of India for 1890. The following gives six instances of the considerable apparent increase in the mean rainfall :—

PROVINCE.	STATION.	Average annual rainfall based on data up to 1890.	Average annual rainfall based on data up to 1896.	Increase in average result.
		Inches.	Inches.	Inches.
BOMBAY	Lanavla	164'24	172'75	+8'51
Do	Jetalsar	23'60	30'39	+6'79
BENGAL AND ORISSA	Keonjhar	31'29	37'98	+6'69
Do	Narsingpur	39'02	44'72	+5'70
Do	Bispara	49'69	55'07	+5'38
CENTRAL PROVINCES	Sarangarh	50'50	55'84	+5'34

Table XVII gives the variations of the monthly and annual rainfall in 1899 of 536 stations in India, Baluchistan and Burma.

The following four tables (Tables XVIII to XXI) give summaries of the rainfall data of the year. In the first two tables (Tables XVIII and XIX) the summaries are drawn up in the form that was used for many years in the Annual Reports issued by the Department and are based on the rainfall returns of 432 selected stations. In the two succeeding tables (Tables XX and XXI) the actual average rainfall data (derived from the returns of 2,288

rain-gauge stations in India) are given for the 57 meteorological districts into which the Empire is divided for the comparison of crops and rainfall for the four periods into which the year may be arranged. The four periods are as follows :—

1st.—From January 1st to February 28th, which forms the period of the cold weather rains of Upper India.

2nd.—From March 1st to May 31st, which includes the hot season, when rain occurs mainly in

the coast districts, and in Assam during thunderstorms.

3rd.—From June 1st to October 31st, which forms the period of the south-west monsoon rains proper.

4th.—From November 1st to December 31st, which includes the period of the so-called north-east monsoon rains of Southern India, more especially of the Coromandel coast districts.

TABLE XVII.—Comparison of the monthly and total rainfall (in inches) in 1899 with the averages of past years.

PROVINCE.	STATION.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	TOTAL.
		Inches.	Inches.	Inches.	Inch.	Inches.	Inches.	Inches.	Inches.	Inch.	Inch.	Inches.	Inches.	Inches.
BALUCHISTAN.	Kalat . .	—1'90	—0'87	—1'08	—0'48	—0'06	—0'21	—0'52	—0'52	—0'05	—0'05	+0'02	—0'01	—5'73
	Pishin . .	—2'77	+0'68	+0'33	—0'81	—0'19	—0'06	—0'21	—0'21	—0'01	—0'02	—0'30	—1'09	—4'66
	Chaman . .	—1'52	+0'39	—1'06	—0'42	0	—0'22	—0'29	0	0	—0'08	—0'72	—0'15	—4'07
	Quetta . .	—2'05	—0'13	+0'34	—0'96	+1'45	—0'14	—0'48	—0'62	—0'13	0	+0'23	—0'21	—2'70
	Mach . .	—2'16	—1'73	+0'80	—0'09	+0'13	—1'25	—1'34	—0'41	—0'05	—0'62	—0'15	—0'79	—7'66
	Beleli . .	—2'30	—0'61	+0'57	—0'59	—0'32	—0'22	—0'11	—0'56	—0'04	—0'10	—0'46	—0'99	—5'73
	Kuchlak . .	—2'53	+0'40	+0'41	—0'68	—0'18	—0'13	—0'19	—0'25	—0'19	+0'02	—0'47	—1'28	—5'07
	Fort Sandeman .	—0'94	+0'33	—0'56	—0'41	+0'08	+0'01	—2'56	—1'48	—0'01	—0'02	—0'45	—0'16	—6'17
	Bostan . .	—2'35	—0'37	+0'26	—0'77	—0'07	—0'29	—0'44	—0'26	—0'04	—0'04	—0'44	—1'42	—6'23
	Yarookarez . .	—1'76	—0'16	+0'28	—0'54	0	—0'08	—0'02	—0'23	0	—0'03	—0'07	—1'21	—3'82
	Syad Hamed . .	—2'22	—0'52	+0'67	—0'41	0	—0'01	0	—0'13	0	—0'05	—0'67	—1'01	—4'35
	Gulistan . .	—1'90	+0'27	+0'68	—0'49	—0'13	—0'07	—0'05	0	—0'06	—0'10	—0'56	—1'13	—3'54
	Killa, Abdulla .	—2'30	—0'18	+1'25	—0'50	—0'10	—0'05	—0'13	—0'04	—0'03	—0'15	—0'79	—1'07	—4'09
	Khanai . .	—2'33	—0'53	+0'04	—0'81	0	—0'23	—0'25	—0'30	0	—0'11	—0'49	—0'91	—5'97
	Fuller's Camp .	—2'71	—0'79	—0'49	—0'88	—0'22	—0'03	—0'43	—0'22	—0'09	+0'05	—0'78	—0'77	—7'36
	Kachh . .	—1'44	+2'93	—0'30	—0'93	+0'13	—0'36	—0'29	—0'23	—0'14	—0'07	—0'94	—0'56	—2'20
	Mudgorge . .	—2'57	—0'10	+1'71	—0'41	+0'03	—0'32	—0'33	—0'35	—0'06	—0'08	—0'73	—0'57	—3'78
	Mangi . .	—1'12	—0'04	+4'12	—0'64	—0'19	—0'79	—0'46	—0'36	—0'16	—0'13	—0'37	—1'06	—1'20
	Dirgi . .	—1'56	—0'29	+3'92	—0'47	+0'10	—0'68	—0'72	—0'39	—0'15	—0'09	—0'21	—1'27	—1'81
	Khost . .	—2'30	—1'11	+3'32	—0'21	+0'33	—0'67	—1'32	+0'07	—0'24	—0'29	—0'76	—1'36	—4'54
	Shahrig . .	—2'51	+4'95	+1'77	—0'23	—0'48	—1'07	—2'55	—1'81	—0'54	—0'17	—0'96	—1'05	—4'65
	Nasak . .	—1'61	—1'51	+0'83	+0'02	—0'38	—1'23	—0'70	—0'56	—0'53	—0'13	—1'00	—1'13	—7'93
	Harnai . .	—1'71	—1'57	+1'20	+0'30	—0'16	—1'24	—1'92	—1'01	—0'48	—0'12	—0'80	—1'22	—8'73
	Sunari . .	—1'36	—1'15	+0'71	—0'32	—0'23	—1'39	—2'57	—1'47	—0'45	—0'12	—0'70	—0'85	—9'90
	Spintangi . .	—0'91	—1'62	+0'22	—0'11	—0'28	—1'11	—2'42	+0'36	—0'31	0	—0'42	—0'80	—7'40
	Mushkaf . .	?	?	+0'09	—0'06	+0'24	—0'33	—0'14	+0'16	—0'02	0	—0'17	—0'06	?
	Baber Kuch . .	—0'87	—0'89	+0'16	—0'09	—0'16	—0'49	—1'57	—1'26	—0'34	—0'04	—0'41	—0'52	—6'49

TABLE XVII.—Comparison of the monthly and total rainfall (in inches) in 1899 with the averages of past years—contd.

PROVINCE,	STATION.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	TOTAL.
		Inches.	Inches.	Inches.	Inches.	Inches.	Inches.	Inches.	Inches.	Inches.	Inches.	Inches.	Inches.	Inches.
BALUCHISTAN—contd.	Loralai (Hospital)	—1'11	—0'55	+0'04	—0'21	+0'64	—0'47	—1'74	+0'16	—0'19	—0'19	—0'38	—0'34	—4'34
	Nari . . .	—0'76	—0'51	—0'01	—0'08	—0'10	—0'35	—1'81	—0'99	—0'22	—0'01	—0'32	—0'49	—5'65
	Sibi . . .	—0'83	—0'19	+0'15	—0'10	—0'04	—0'30	—1'61	—0'27	—0'12	0	—0'26	—0'56	—4'13
	Kolepur . .	—1'55	—0'78	+2'57	—0'39	—0'09	—0'16	—1'47	—0'76	—0'21	—0'06	—0'13	—0'33	—3'18
	Mihtri . . .	—0'69	—0'25	—0'26	—0'15	0	—0'28	—1'00	—0'42	0	—0'03	—0'23	—0'42	—3'73
	Lindsay . .	—0'51	—0'53	—0'26	—0'11	—0'02	—0'23	—1'13	—0'74	—0'12	0	—0'19	—0'31	—4'15
	Bellput . .	—0'45	—0'22	—0'14	—0'05	—0'03	—0'15	—0'84	—0'81	—0'03	0	8	—0'16	—3'16
	Nuttal . . .	—0'59	+0'39	—0'19	—0'09	+1'13	—0'11	—1'06	—1'06	—0'20	0	—0'56	—0'36	—2'80
	Temple Derei .	—0'61	—0'46	—0'07	—0'07	+0'45	—0'33	—0'99	—1'16	—0'03	0	—0'33	—0'16	—3'76
	Jhatput . .	—0'37	—0'43	—0'11	—0'03	+0'15	—0'16	—0'60	—0'77	—0'17	0	—0'29	—0'14	—2'92
	Sangal . . .	—1'82	+1'36	+0'82	—0'10	+0'02	—0'02	—0'38	—0'09	0	—0'09	—0'62	—0'33	—1'25
	Shalabagh . .	—3'24	—1'91	—0'66	—0'36	—0'02	—0'04	—0'71	0	0	+0'09	—0'38	—0'93	—8'16
	Panir . . .	—1'15	—0'36	+0'26	0	+0'21	—0'31	—0'30	+0'06	—0'04	—0'01	—0'14	—0'36	—2'14
	Abbottabad .	—3'13	—0'66	—2'42	+0'07	—1'69	+1'89	—2'55	—2'55	—1'53	—0'09	—0'93	—1'40	—14'9
	Cherat . . .	—2'94	+1'97	—2'50	—1'61	—0'87	+0'70	+0'16	—3'09	—1'91	+0'14	—0'18	—0'70	—10'83
	Murree (Obsy.)	—3'74	—1'33	—1'29	—0'90	—2'67	+3'11	—0'54	—6'39	—3'13	—1'40	—1'41	—1'12	—20'81
	Poo . . .	—3'10	—1'88	—2'07	—1'69	—0'67	+0'20	—1'14	—0'45	—0'45	—0'14	—0'69	—1'01	—13'09
	Dharmasala .	—3'48	—0'18	—3'55	—1'26	+2'19	—0'96	+6'73	—16'59	—11'69	—0'96	—0'28	—2'45	—32'48
	Kailang . .	—2'65	—0'03	—0'26	+1'46	—0'19	—0'79	—0'89	—1'24	—1'80	—0'13	+0'05	—0'81	—7'28
	Kilba . . .	—3'37	—1'42	—4'67	—0'18	—2'11	—0'51	—3'33	—3'74	—3'75	—0'47	—1'98	—1'56	—27'09
PUNJAB.	Simla (Obsy.)	—2'53	—0'86	—2'41	—1'26	—1'70	+1'51	—4'78	—6'48	—6'03	—1'09	—0'45	—1'21	—27'29
	Peshawar (Obsy.)	—1'57	+1'84	+0'81	—0'54	—0'40	—0'11	—0'82	—1'26	—0'67	—0'14	—0'64	—0'49	—3'99
	Kohat . . .	—1'35	+0'57	+0'05	—0'70	—1'22	+0'42	—1'02	—2'26	—0'27	—0'52	—0'67	—0'47	—7'45
	Bannu . . .	—0'86	+0'63	+1'57	—0'97	—0'59	—0'18	+0'56	—2'29	—0'67	—0'15	—0'20	—0'20	—3'35
	Deralsmail Khan	—0'47	+0'69	—0'51	—0'70	—0'23	+0'27	—2'05	+1'52	—0'35	—0'11	—0'16	—0'31	—2'41
	Dera Ghazi Khan	—0'44	—0'22	—0'59	—0'31	—0'48	—0'46	—1'71	—1'17	—0'35	—0'05	—0'13	—0'25	—6'16
	Muzaffargarh .	—0'36	—0'22	—0'38	—0'33	—0'37	—0'30	—0'94	—0'65	—0'51	+0'07	—0'09	—0'27	—4'35
	Mooltan (Obsy.)	—0'42	—0'15	—0'44	—0'24	—0'42	+1'12	—1'62	—0'92	—0'65	+0'02	—0'02	—0'27	—4'01
	Jhang . . .	—0'54	—0'31	—0'77	—0'34	—0'38	—0'64	—2'34	—1'12	—0'62	—0'15	—0'03	—0'32	—7'56
	Montgomery .	—0'56	—0'60	—0'46	—0'17	—0'30	—0'82	—2'85	—2'26	—0'93	—0'14	—0'06	—0'26	—9'41
	Shahpur . . .	—0'84	—0'59	—0'86	—0'32	—0'39	+1'17	—2'80	—2'57	—1'52	—0'16	—0'25	—0'36	—9'49
	Rawalpindi .	—2'57	—0'04	—1'20	—0'98	—1'34	+0'67	—1'07	—3'19	—0'48	+0'47	—0'68	—1'08	—11'49
	Jhelum . . .	—2'00	—0'18	—1'13	—0'40	+0'73	+0'17	—1'15	—4'72	—2'03	—0'40	—0'22	—0'80	—12'13
	Gujarat . . .	—2'02	—0'52	—1'34	—0'96	—0'25	+0'56	—4'80	—6'58	—2'08	—0'44	—0'23	—0'67	—19'33
	Sialkot (Obsy.)	—2'01	—0'62	—1'00	—1'09	—0'03	—0'38	—5'21	—8'96	—2'66	—0'53	—0'29	—0'79	—23'57

TABLE XVII.—Comparison of the monthly and total rainfall (in inches) in 1899 with the averages of past years.—contd.

PROVINCE.	STATION.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	TOTAL.
		Inches.	Inches.	Inches.	Inch.	Inches.	Inches.	Inches.	Inches.	Inches.	Inch.	Inch.	Inches.	Inches.
PUNJAB—concl.	Gujranwala .	—1'52	+0'39	—0'67	—0'48	—0'42	+0'69	—3'16	—2'53	—1'99	—0'46	—0'22	—0'62	—10'99
	Gurdaspur .	—2'21	—0'41	—1'24	—0'17	—0'45	—0'50	—7'02	—6'69	—3'52	—0'44	—0'15	—1'08	—23'88
	Lahore .	—0'90	—1'00	—0'76	—0'26	—0'83	—0'27	—4'02	—4'05	—1'85	—0'36	—0'13	—0'46	—14'89
	Amritsar .	—1'35	—0'85	—0'87	—0'26	—0'85	—0'09	—3'59	—4'65	—2'55	—0'45	—0'20	—0'63	—16'34
	Ferozepore .	—1'16	—0'78	—0'71	—0'35	—0'57	—1'19	—6'33	—2'75	—2'28	—0'55	—0'06	—0'48	—17'21
	Jullundur .	—1'58	—0'94	—1'15	—0'17	—0'79	—0'26	—5'21	—5'47	—3'49	—0'17	—0'10	—0'67	—20'00
	Hoshiarpur .	—1'93	—0'46	—1'36	—0'27	+1'20	—0'07	—5'52	—5'70	—3'28	—0'15	—0'15	—1'17	—18'86
	Ludhiana .	—1'60	—0'99	—1'35	—0'27	—0'95	+0'17	—5'09	—5'76	—4'06	—0'64	—0'09	—0'88	—21'51
	Umballa .	—1'61	—0'01	—0'90	+0'09	—0'73	+3'97	—6'61	—6'72	—4'34	—0'48	—0'26	—0'65	—18'25
	Sirsa .	—0'79	—0'31	—0'45	—0'34	—0'65	—0'54	—3'33	—3'79	—1'90	—0'25	—0'03	—0'36	—12'74
	Hissar .	—0'71	—0'42	—0'54	—0'22	—0'14	+4'60	—4'19	—4'02	—1'85	—0'28	—0'08	—0'43	—8'28
	Rohtak .	—0'83	—0'58	—0'59	+0'01	—0'70	+2'31	—3'02	—3'93	—3'19	—0'37	—0'04	—0'50	—11'43
	Delhi (Obsy.) .	—1'04	—0'45	—0'70	+0'03	—0'35	+1'25	—3'46	—6'41	—4'05	—0'42	—0'10	—0'43	—16'13
	Gurgaon .	—0'88	—0'24	—0'53	—0'04	—0'41	+0'76	—4'09	—4'79	—3'07	—0'37	—0'04	—0'34	—14'04
	Karnal .	—1'37	—0'30	—0'80	+0'40	—0'82	+0'80	—7'02	—7'01	—4'49	—0'08	—0'13	—0'47	—21'29
SIND.	Kurrachee .	—0'73	—0'32	+0'20	—0'14	—0'04	—0'51	—3'22	—1'61	—0'65	—0'05	0	—0'19	—7'26
	Sehwan .	—0'44	—0'27	+0'27	—0'16	—0'13	—0'32	—1'87	—2'59	—0'55	—0'03	—0'13	—0'13	—6'35
	Tatta .	—0'34	—0'22	+0'54	—0'31	—0'02	—1'01	—3'73	—1'70	—0'81	0	—0'22	—0'09	—7'91
	Hyderabad (Obsy.)	—0'29	—0'21	+0'59	—0'16	—0'13	—0'48	—2'73	—3'14	—0'57	0	—0'12	—0'04	—6'88
	Umarkot .	—0'21	—0'08	—0'12	—0'09	—0'04	—0'88	—3'58	—3'43	—0'97	—0'16	—0'06	—0'02	—9'64
	Shikarpur .	—0'36	—0'31	—0'15	—0'17	+0'75	—0'11	—1'05	—1'64	—0'19	0	—0'14	—0'15	—3'52
	Rohri .	—0'35	—0'46	—0'21	—0'27	—0'17	—0'24	—1'17	—1'33	—0'26	—0'01	—0'12	—0'18	—4'77
CUTCH	Jacobabad .	—0'29	—0'16	0	—0'18	+1'49	—0'11	—1'23	—1'23	—0'19	—0'01	—0'13	—0'11	—2'15
	Bhoj .	—0'07	—0'13	—0'08	—0'10	—0'14	—1'60	—6'07	—2'99	—1'83	—0'70	—0'09	—0'06	—13'86
	Rhahpur .	—0'03	—0'10	—0'06	—0'06	—0'15	—1'66	—8'93	—3'45	—2'62	—0'54	—0'20	—0'01	—17'81
RAJPUTANA.	Nagar .	—0'15	—0'10	—0'05	—0'03	—0'05	—1'81	—6'17	—5'23	—1'98	—0'27	—0'05	+0'01	—15'88
	Jaisalmer .	—0'34	—0'13	—0'12	+0'20	—0'26	—0'88	—2'69	—2'30	—0'45	0	—0'03	—0'11	—7'11
	Phalodi .	—0'21	—0'07	—0'12	—0'02	—0'08	—0'66	—2'73	—2'55	—0'62	0	0	—0'03	—7'09
	Bikaner .	—0'43	—0'21	—0'21	—0'16	—0'92	—1'34	—3'04	—3'02	—0'92	—0'09	—0'07	—0'18	—10'59
	Nagar .	—0'40	—0'10	—0'19	+0'29	—0'55	—1'86	—2'57	—4'11	—1'86	—0'06	—0'09	—0'32	—11'82
	Didwana .	—0'53	—0'16	—0'33	—0'07	—0'58	—0'21	—3'83	—5'70	—1'67	—0'07	—0'17	—0'25	—13'57
	Jhunjhunu .	—0'94	—0'24	—0'28	—0'11	+0'66	+6'20	—5'45	—5'82	—2'06	—0'17	—0'06	—0'25	—8'52
	Khetri .	—1'02	—0'71	—0'48	—0'14	+0'72	+4'30	—6'39	—8'18	—2'33	—0'30	—0'12	—0'27	—14'92
	Sikar .	—0'65	—0'20	—0'27	—0'03	—0'26	+6'20	—5'36	—6'21	—1'57	—0'24	—0'14	—0'31	—9'04
	Sri Madhopur .	—0'69	—0'50	—0'28	—0'09	—0'38	+5'90	—5'76	—7'90	—2'37	—0'06	—0'23	—0'52	—12'88

TABLE XVII.—Comparison of the monthly and total rainfall (in inches) in 1899 with the averages of past years.—contd.

PROVINCE.	STATION.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	TOTAL.
		Inch.	Inch.	Inch.	Inches.	Inches.	Inches.	Inches.	Inches.	Inches.	Inches.	Inch.	Inch.	Inches.
RAJPUTANA—contd.	Alwar . .	—0'64	—0'40	—0'30	+0'16	+0'14	+3'67	—3'48	—9'42	—3'97	—0'80	—0'20	—0'45	—15'69
	Bharatpur . .	—0'47	—0'20	—0'27	—0'11	+1'24	+9'52	—1'23	—8'31	—3'82	—0'39	—0'06	—0'29	—4'39
	Bandikui . .	—0'51	—0'17	—0'40	—0'04	—0'18	+3'33	—1'67	—8'67	—3'07	—0'12	—0'22	—0'45	—12'17
	Jaipur . .	—0'49	—0'20	—0'35	—0'06	—0'19	+2'03	—3'38	—7'96	—3'09	—0'24	—0'17	—0'36	—14'46
	Sambhar . .	—0'35	—0'18	—0'25	+0'07	—0'83	+2'15	—2'69	—6'35	—3'21	—0'33	—0'25	—0'42	—12'64
	Karauli . .	—0'38	—0'14	—0'19	—0'05	+0'36	+6'92	—2'79	—10'52	—4'36	—0'15	—0'11	—0'33	—11'74
	Lalsot . .	—0'41	—0'07	—0'7	+0'28	—0'01	+3'62	+0'77	—10'61	—2'01	—0'18	—0'13	—0'20	—9'12
	Tonk . .	—0'22	—0'22	—0'20	—0'04	+0'62	—0'62	—2'14	—9'87	—3'12	—0'52	—0'08	—0'23	—16'64
	Siwai Madhopur	—0'40	—0'13	—0'25	—0'03	+0'40	+9'38	—3'03	—12'32	—3'78	—0'14	—0'14	—0'18	—10'62
	Deoli . .	—0'27	—0'17	—0'16	+0'14	—0'54	+3'07	—5'04	—10'23	—3'55	—0'40	—0'14	—0'18	—17'47
	Kotah . .	—0'28	—0'21	—0'10	—0'01	—0'11	+1'97	—0'91	—9'72	—4'45	—0'37	—0'17	—0'23	—14'59
	Jhalrapatan . .	—0'23	—0'31	—0'15	—0'04	—0'42	+6'61	—6'59	—9'68	—4'94	—0'97	—0'26	—0'47	—17'45
	Ajmer . .	—0'35	—0'31	—0'35	+0'87	—0'43	+0'81	—2'02	—7'36	—2'66	—0'29	—0'21	—0'29	—12'58
	Nasirabad . .	—0'19	—0'33	—0'12	+0'03	—0'57	+2'20	—4'02	—6'15	—2'67	—0'24	—0'19	—0'31	—12'56
	Malpura . .	—0'43	—0'04	—0'31	+0'16	+0'31	+2'19	—0'86	—9'12	—2'39	—0'02	—0'03	—0'28	—10'82
	Beawar . .	—0'24	—0'11	—0'17	—0'12	—0'38	—0'87	—4'41	—6'20	—2'14	—0'18	—0'19	—0'24	—15'25
	Jodhpur . .	—0'28	—0'16	—0'03	—0'05	—0'47	—1'09	—3'93	—5'15	—1'52	—0'13	—0'12	—0'13	—13'06
	Pachpadra . .	—0'39	—0'07	—0'12	—0'04	—0'78	—0'87	—4'09	—3'97	—2'33	—0'06	—0'09	—0'09	—12'90
	Jasol . .	—0'23	—0'05	—0'10	—0'02	—0'56	—0'46	—3'71	—3'78	—1'56	—0'01	—0'21	+0'20	—10'49
	Barmer . .	—0'20	—0'07	—0'09	—0'01	—0'46	—1'47	—3'33	—2'82	—1'91	—0'04	—0'14	—0'05	—10'59
	Pali . .	—0'15	—0'03	—0'12	0	—0'31	—2'11	—4'57	—5'30	—1'58	—0'11	—0'29	—0'10	—14'67
	Shahpura . .	—0'14	—0'17	—0'17	+1'63	+0'08	+2'35	—3'53	—8'02	—3'26	—0'45	—0'10	—0'18	—11'95
	Erinpura . .	—0'19	—0'23	—0'11	+0'07	—0'04	+3'21	—5'37	—5'01	—2'78	—0'37	—0'20	+0'80	—10'22
	Sirohi . .	—0'19	—0'15	—0'11	+0'53	—0'30	—0'76	—7'47	—6'37	—3'12	—0'04	—0'25	+0'37	—17'86
	Mount Abu . .	—0'15	—0'17	—0'09	+0'12	—0'18	—0'82	—11'06	—11'09	—2'47	—0'76	—0'16	—0'04	—26'87
	Kotra . .	—0'13	—0'22	—0'04	—0'03	—0'52	+1'17	—11'99	—9'89	—4'45	—0'52	—0'20	—0'08	—26'90
	Udaipur . .	—0'10	—0'15	—0'08	—0'05	+1'14	+1'95	—6'77	—6'44	—5'49	—0'40	—0'21	+0'03	—16'57
	Partabgarh . .	—0'23	—0'08	—0'03	—0'01	+1'30	—0'48	—8'81	—10'56	—5'35	—0'67	—0'31	—0'19	—25'42
CENTRAL INDIA.	Kherwara . .	—0'10	—0'17	—0'06	+0'12	+0'46	—1'15	—7'65	—8'21	—4'49	—0'54	—0'16	—0'08	—22'03
	Banswara . .	—0'30	—0'11	—0'01	—0'01	+0'14	—4'26	—9'96	—12'21	—7'78	—0'62	—0'26	—0'31	—27'17
	Neemuch (Obsy.)	—0'22	—0'15	—0'10	—0'11	+0'56	+3'45	—8'76	—9'11	—4'68	—0'71	—0'18	—0'26	—20'27
	Sirdarpore . .	—0'18	—0'18	—0'03	—0'02	+0'33	+1'51	—6'71	—6'32	—7'40	—1'11	—0'23	—0'16	—20'50
	Agar . .	—0'27	—0'17	—0'04	—0'06	+0'39	+0'72	+4'60	—10'46	—6'77	—0'70	—0'20	—0'40	—22'56
	Rutlam . .	—0'19	—0'17	—0'03	+0'23	+0'07	+4'09	—7'09	—10'21	—7'01	—0'88	—0'28	+0'52	—20'95
	Indore . .	—0'28	—0'24	—0'05	—0'17	+0'08	+0'14	—3'42	—6'96	—6'24	—1'14	—0'28	—0'20	—18'76

TABLE XVII.—Comparison of the monthly and total rainfall (in inches) in 1899 with the averages of past years—contd.

PROVINCE.	STATION.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Total.
		Inches.	Inches.	Inches.	Inches.	Inches.	Inches.	Inches.	Inches.	Inches.	Inches.	Inches.	Inches.	Inches.
CENTRAL INDIA—concl'd.	Bhopal (Sehore)	-0.48	-0.24	-0.16	-0.06	-0.12	+0.94	-6.19	-11.51	-8.01	-1.31	-0.43	-0.84	-28.41
	Goona . .	-0.45	+0.01	-0.21	-0.11	-0.09	+5.12	-0.78	-12.68	-2.93	-0.50	-0.39	-0.34	-13.35
	Morar . .	-0.45	-0.31	-0.17	-0.10	-0.40	+7.29	-3.60	-10.07	-3.63	-0.50	-0.04	-0.33	-12.31
	Nowgong .	-0.05	-0.24	-0.24	+0.48	-0.33	+16.93	-5.52	-6.19	-4.77	-1.16	-0.19	-0.48	-1.76
	Sutna . .	-0.54	-0.40	-0.43	-0.08	+0.39	+0.55	-8.05	-3.20	-3.96	-2.23	-0.30	-0.37	-18.62
	Nagode . .	-0.52	-0.14	-0.32	-0.15	+0.71	+1.67	-9.95	-2.63	-3.27	-2.15	-0.19	-0.47	-17.41
	Maihar . .	-0.68	+0.53	-0.33	-0.09	+0.67	-3.83	-5.12	-4.58	-5.92	-2.25	-0.53	-0.54	-22.67
	Rewah . .	-0.52	-0.08	-0.29	-0.07	-0.09	-2.58	-10.01	-6.30	-5.43	-2.42	-0.33	-0.33	-28.45
	Chandia . .	-0.88	+0.62	-0.38	0	-0.01	-6.14	-9.90	-7.86	-6.26	-2.43	-0.31	-0.41	-33.96
	Ramnagar .	-0.71	-0.05	-0.32	-0.06	-0.32	-4.78	-5.40	-9.89	-5.76	-2.43	-0.37	-0.59	-30.68
	Sihawal (Bardi)	-0.48	-0.34	-0.69	+0.28	-0.31	-2.80	+3.37	-5.19	-6.12	-1.93	-0.60	-0.45	-15.26
	Tyonthar .	-0.18	-0.36	-0.35	+0.21	-0.33	+3.75	-1.94	-2.11	-5.52	-2.52	-0.22	-0.43	-10.00
	Sohagpur .	-1.06	-0.25	-0.57	-0.21	-0.07	-5.43	-8.46	-2.46	-4.94	-2.46	-0.97	-0.54	-27.42
	Chakrata .	-0.66	+0.15	-1.63	+1.14	+1.33	+3.83	+3.11	-7.35	-2.04	-0.58	-0.38	-1.11	-4.19
	Mussooree .	+1.59	-0.61	-2.38	-0.35	-1.43	+5.05	-3.92	-25.96	-8.29	-1.04	-0.40	-1.06	-38.80
	Srinagar . .	-1.41	-1.94	-1.51	-0.09	-0.78	+5.81	+6.13	-6.90	-2.72	-0.79	-0.26	-0.67	-5.13
	Pauri . .	-1.65	-1.89	-1.64	+0.26	-0.83	+6.94	+5.35	-9.23	-4.41	-0.83	-0.31	-0.71	-8.95
	Ranikhet .	-1.31	-0.16	-1.82	+0.65	-1.74	+3.18	+2.50	-7.55	-6.07	-1.46	-0.28	-0.85	-14.91
	Almora . .	-1.37	+0.54	-0.63	+1.68	-1.56	+3.68	+5.19	-1.37	-2.25	-1.15	-0.21	-0.58	+1.97
NORTH-WESTERN PROVINCES.	Pithoragarh .	-1.40	+1.18	-1.70	+0.66	+0.79	+5.30	+5.11	-2.34	-5.20	-1.31	-0.15	-0.65	+0.29
	Naini Tal .	-1.67	-0.08	-2.38	+0.53	-0.93	+2.25	+7.36	-12.75	-8.94	-2.18	-0.24	-1.12	-20.15
	Dehra Dun .	-1.77	+0.53	-1.14	+0.14	+0.78	+5.00	+6.12	-18.98	-7.59	-0.86	-0.21	-0.61	-18.59
	Saharanpur .	-1.53	-1.19	-0.59	+0.05	-0.16	+3.03	-6.73	-8.92	-4.25	+1.25	-0.23	-0.67	-19.96
	Roorkee . .	-1.68	-0.94	-0.80	+0.05	+0.21	+2.36	-4.06	-10.89	-5.29	+0.53	-0.25	-0.46	-21.22
	Muzaffarnagar .	-1.14	+0.10	-0.84	+0.10	-0.43	+3.78	-6.34	-6.87	-3.84	-0.16	-0.12	-0.38	-16.14
	Bijnor . .	-1.13	+0.74	-0.88	+0.69	-0.64	+4.03	-1.68	-9.51	-5.97	-0.18	-0.14	-0.37	-15.04
	Meerut . .	-0.97	-0.75	-0.67	-0.22	-0.08	+7.74	-5.45	-6.38	-4.00	-0.46	-0.09	-0.39	-11.71
	Moradabad .	-0.90	+0.20	-0.76	+0.58	+0.22	+0.85	-0.83	-8.06	-5.68	-0.87	-0.11	-0.39	-15.75
	Rudrapur .	-1.10	+0.07	-0.87	-0.23	+1.20	+1.66	+0.75	-5.57	-5.99	-1.09	-0.08	-0.44	-11.69
	Pilibhit . .	-0.09	-0.98	-0.80	+0.06	+1.41	+6.58	+1.78	-8.03	-6.66	-1.21	-0.10	-0.46	-8.55
	Bulandshahr .	-0.79	-0.83	-0.43	-0.27	+0.51	+6.61	-3.01	-7.54	-4.35	-0.45	-0.08	-0.44	-11.08
	Bareilly . .	-0.87	-0.67	-0.69	-0.10	+0.74	+2.77	+1.29	-7.45	-5.51	-1.26	-0.11	-0.30	-12.16
	Budaun . .	-0.71	-0.46	-0.47	-0.14	-0.22	+9.22	+6.86	-4.40	-5.69	-0.90	-0.11	-0.31	+2.67
	Shahjahanpur .	-0.48	-0.34	-0.56	+0.13	-0.26	-0.55	+5.41	-3.42	-6.90	-1.23	-0.14	-0.28	-8.62
	Aligarh . .	-0.76	-0.46	-0.39	-0.17	+0.34	+9.08	-1.72	-5.80	-4.47	-0.48	-0.04	-0.34	-5.21

TABLE XVII.—Comparison of the monthly and total rainfall (in inches) in 1899 with the averages of past years—contd.

PROVINCE.	STATION.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	TOTAL.
		Inches.	Inches.	Inches.	Inches.	Inches.	Inches.	Inches.	Inches.	Inches.	Inches.	Inches.	Inches.	Inches.
NORTH-WESTERN PROVINCES—contd.	Muttra . .	—0'57	—0'27	—0'25	+0'45	—0'17	+1'42	—2'58	—7'68	—4'26	—0'37	—0'04	—0'27	—14'59
	Agra . .	—0'55	—0'22	—0'26	+0'40	+0'41	+7'02	+1'76	—6'81	—4'07	—0'41	—0'06	—0'27	—3'06
	Etah . .	—0'57	—0'13	—0'31	—0'08	—0'23	+9'15	+3'47	—7'30	—2'89	—0'84	—0'05	—0'27	—0'05
	Mainpuri . .	—0'62	—0'06	—0'29	+0'03	—0'17	+9'04	+2'05	—6'27	—4'51	—0'84	—0'11	—0'34	—2'09
	Farrukhabad . .	—0'58	—0'06	—0'39	+0'30	—0'46	+2'54	+1'84	—1'34	—4'84	—1'01	—0'09	—0'31	—4'40
	Etawah . .	—0'55	—0'21	—0'40	—0'02	—0'22	+11'37	+0'48	—8'13	—2'34	—0'97	—0'09	—0'26	—1'34
	Cawnpore . .	—0'47	—0'21	—0'25	—0'13	—0'37	+3'91	+8'77	+0'09	—0'91	—1'27	—0'14	—0'22	+8'80
	Fatehpur . .	+0'27	—0'23	—0'28	+0'54	—0'33	+6'07	+6'18	—3'24	—3'60	—1'62	—0'18	—0'26	+3'32
	Jalaun (Orai) . .	—0'47	—0'17	—0'22	+0'49	0	+7'60	—0'30	—3'00	—3'19	—0'78	—0'05	—0'23	—0'32
	Hamirpur . .	—0'29	—0'37	—0'23	+0'24	—0'01	+12'96	+12'11	—3'37	—2'72	—1'11	—0'18	—0'31	+16'73
	Banda . .	+0'03	—0'37	—0'29	—0'09	+0'13	+9'89	+7'28	—0'99	—3'95	—1'49	—0'39	—0'24	+9'51
	Allahabad . .	—0'03	—0'41	—0'41	+0'97	—0'31	+3'86	+4'92	+0'77	—4'82	—2'46	—0'26	—0'22	+1'60
	Basti . .	+0'49	—0'29	—0'31	+0'50	+1'87	+2'66	+10'46	—0'81	—7'15	—2'66	—0'06	—0'11	+4'99
	Gorakhpur . .	+0'15	—0'39	—0'41	+1'57	+0'84	—2'42	+24'95	+3'38	—6'87	—0'91	—0'18	—0'12	+19'59
	Azamgarh . .	+0'69	—0'25	—0'36	+1'03	—0'34	+4'96	+15'58	+1'19	—4'91	—2'33	—0'11	—0'14	+15'01
	Jaunpur . .	+0'43	—0'31	—0'30	—0'01	—0'33	+11'72	+1'93	—3'90	—6'00	—3'01	—0'16	—0'12	—0'06
	Benares . .	—0'04	—0'38	—0'34	+1'19	+1'67	+12'33	+6'44	—1'50	—3'89	—1'86	—0'19	—0'14	+13'29
	Mirzapur . .	+0'28	—0'52	—0'51	+0'29	—0'41	+6'34	+3'02	+1'09	—4'46	—2'08	—0'29	—0'15	+2'60
	Ballia . .	+0'14	—0'50	—0'23	+1'20	+0'56	+0'94	+15'88	+9'37	—4'07	—0'55	—0'20	—0'12	+22'42
	Dudhi . .	+0'11	—0'29	—0'46	+0'12	+0'71	+3'98	+8'08	—1'87	—5'92	—2'58	—0'31	—0'28	+1'29
	Robertsganj . .	—0'10	—0'53	—0'45	+1'13	+0'20	+3'12	+4'24	—3'47	—5'85	—2'12	—0'42	—0'23	—4'48
	Jhansi . .	—0'55	—0'01	—0'37	+0'32	+0'01	+10'03	—0'91	—10'12	—5'18	—0'72	—0'07	—0'24	—7'81
OUDH.	Lalitpur . .	—0'49	+0'25	—0'34	—0'13	—0'23	+2'94	+5'88	—9'26	—2'89	—1'00	—0'19	—0'38	—5'84
	Kheri . .	—0'50	—0'57	—0'53	—0'14	+3'11	—2'15	+6'65	—2'53	—5'17	—1'48	—0'17	—0'39	—3'87
	Sitapur . .	+0'11	+0'15	—0'50	+0'23	—0'72	+0'99	+5'24	—3'90	—4'15	—1'47	—0'17	—0'32	—4'51
	Bahraich . .	+0'03	—0'61	—0'44	+1'05	+2'53	—1'45	—3'30	+0'82	—6'09	—1'84	—0'13	—0'40	—9'83
	Gonda . .	+0'16	—0'54	—0'36	+0'94	+1'51	+7'25	+6'96	—8'85	—7'13	—1'67	—0'10	—0'28	—2'11
	Hardoi . .	—0'25	—0'21	—0'65	+0'30	+0'64	+0'25	+3'48	—3'51	—5'13	—1'29	—0'13	—0'36	—6'86
	Nawabganj (Bara Banki.)	—0'86	—0'20	—0'40	—0'17	+0'15	—1'14	+3'51	—1'15	—5'83	—1'20	—0'08	—0'48	—7'85
	Lucknow . .	—0'53	—0'12	—0'34	—0'03	+1'57	+1'11	+7'11	—5'73	—5'36	—1'39	—0'09	—0'45	—4'25
	Unao . .	—0'61	—0'19	—0'31	—0'11	—0'56	+3'27	+9'52	—4'91	—3'02	—1'48	—0'10	—0'36	+1'14
	Fyzabad . .	+0'02	—0'23	—0'53	—0'07	+0'55	+6'03	+8'61	+1'20	—7'52	—1'59	—0'09	—0'22	+6'16
	Sultanpur . .	+0'51	—0'14	—0'24	+1'00	—0'35	+1'13	+5'69	—3'69	—5'87	—2'41	—0'17	—0'23	—4'77
	Rae Bareilly . .	+0'37	—0'37	—0'26	+0'27	—0'31	+5'44	+5'72	+0'43	—6'31	—1'47	—0'12	—0'22	+3'17
	Partabgarh . .	+2'13	—0'13	—0'24	+0'27	+0'33	+3'61	+11'01	—2'15	—4'99	—2'49	—0'24	—0'28	+6'83

TABLE XVII—Comparison of the monthly and total rainfall (in inches) in 1899 with the averages of past years—contd.

PROVINCE.	STATION.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	TOTAL.
		Inches.	Inches.	Inches.	Inches.	Inches.	Inches.	Inches.	Inches.	Inches.	Inches.	Inches.	Inches.	Inches.
BENGAL.	Motihari . .	—0'15	—0'33	—0'50	+2'31	+0'92	—0'18	+6'62	—1'04	—0'26	—3'37	—0'13	—0'13	+3'76
	Darbhanga . .	+0'58	—0'21	+0'28	+2'19	+0'09	+1'93	+4'75	+8'85	—2'50	+0'40	—0'08	—0'12	+16'36
	Siwan . .	+0'43	+0'44	—0'26	+1'86	+2'66	+2'14	+6'99	+11'19	—3'10	—2'66	—0'19	—0'11	+19'39
	Buxar . .	+1'72	—0'40	—0'30	+0'19	—0'46	+5'92	+9'02	—0'15	—5'61	—2'28	—0'43	—0'18	+7'04
	Chapra . .	+0'36	+0'12	—0'41	+1'20	—0'16	+1'44	+15'51	+6'76	—1'52	—2'28	—0'27	—0'09	+20'66
	Arrah . .	+0'97	—0'20	—0'49	+1'59	+1'50	+1'13	+8'47	—0'37	—0'80	—0'30	—0'24	—0'13	+11'13
	Patna (Bankipore)	+0'34	—0'05	—0'36	+0'87	+0'74	+4'65	+8'07	+0'45	—3'60	—0'94	—0'22	—0'15	+9'80
	Muzaffarpur . .	0	—0'29	+0'59	+1'69	+4'68	+4'91	+13'52	+14'28	—0'94	—1'19	—0'13	—0'07	+37'05
	Barh . .	+1'07	+0'62	—0'22	+0'98	—1'12	+2'38	+13'09	+5'65	—1'62	—1'36	—0'21	—0'09	+19'17
	Sasaram . .	+1'10	—0'47	—0'38	+0'21	+0'42	+9'40	+11'06	—2'23	—2'45	—2'41	—0'31	—0'21	+13'73
	Gaya . .	+1'86	—0'59	—0'45	+0'13	+0'10	+4'96	+12'05	—0'13	—3'04	—1'85	—0'29	—0'16	+12'59
	Jamui . .	+1'67	—0'51	—0'33	+0'14	—0'60	+1'60	+16'90	+5'10	+1'26	—1'39	—0'10	—0'07	+23'67
	Madhipura . .	+0'24	—0'18	—0'41	+3'05	—0'71	+4'52	+7'75	+10'19	+7'52	—3'19	—0'06	—0'06	+28'66
	Monghyr . .	+1'03	—0'20	—0'45	+0'96	—1'56	+6'87	+16'28	+3'01	+0'23	—2'72	—0'21	—0'08	+23'16
	Bhagalpur . .	+1'30	—0'27	—0'41	+0'57	+0'29	—0'01	+16'33	+2'90	+9'42	—3'46	—0'19	—0'08	+26'39
	Godda . .	+1'83	—0'64	—0'51	+1'01	—1'18	+1'66	+8'25	+0'54	+9'25	—2'40	—0'29	—0'10	+17'42
	Palamau . .	+0'17	—0'30	—0'67	—0'01	—0'63	+3'01	+1'90	—7'62	—6'92	—2'40	—0'40	—0'26	—14'13
	Hazaribagh . .	+0'66	—0'69	—0'71	+0'16	+1'46	+6'40	+3'78	—6'59	—6'72	—3'02	—0'34	—0'20	—5'81
	Ranchi . .	+0'49	—0'47	—1'42	+2'64	—1'13	+3'81	—0'46	—6'22	—5'82	—2'88	—0'35	—0'18	—11'99
	Lohardaga . .	+0'34	—0'64	—0'99	+2'97	—0'22	+5'90	—0'06	—8'73	—7'35	—2'38	—0'60	—0'39	—12'15
	Naya Dumka . .	+1'19	+0'10	—0'26	+0'85	—1'29	+9'12	+11'98	—5'24	+1'14	—2'59	—0'36	—0'18	+14'46
	Gobindpur . .	+0'62	—0'68	—0'61	+0'06	+1'27	+3'97	+1'38	—7'60	—0'71	—2'55	—0'20	—0'16	—5'21
	Purulia . .	+0'90	—1'05	—1'00	+1'45	+0'70	+5'06	+4'35	—4'83	+8'23	—2'53	—0'27	—0'20	—10'81
	Sirguja . .	+0'33	+0'24	—0'86	+0'34	—0'78	+3'16	+9'87	—15'11	—5'25	—1'53	—0'65	—0'37	—10'61
	Jushpore . .	—0'37	—0'89	—1'65	+2'51	—0'66	—2'39	—2'21	—3'13	—9'85	—3'95	—0'52	—0'31	—20'31
	Gangpur . .	—0'36	—0'90	—0'97	+2'10	+1'51	+0'39	+2'80	—3'59	—5'25	—2'28	—0'84	—0'36	—7'75
	Chaibassa . .	—0'40	—0'93	—1'23	+4'76	—1'05	—1'16	—3'43	—0'36	—5'44	—0'99	—0'45	—0'27	—10'95
	Barreepudda . .	—0'09	—0'64	—1'40	+1'79	+0'41	+11'73	+6'95	—2'70	—3'29	+1'71	—0'99	—0'13	+13'35
	Keonjhar . .	—0'17	—0'57	—0'55	+3'02	+1'18	+4'31	+2'93	—1'41	—4'43	+4'05	—0'97	—0'18	+7'21
	Jailasore . .	+0'09	—1'01	—1'21	+1'03	+2'03	—2'22	+7'64	+0'85	+0'25	+0'41	—0'76	—0'11	+6'99
	Balasore . .	—0'02	—0'99	—1'67	+1'23	+2'67	+3'97	+4'10	—2'60	—1'55	—0'65	—1'29	—0'20	+3'00
	Bhadrak . .	—0'30	+0'16	—1'47	+4'30	+1'25	+0'27	—2'99	+1'76	—1'95	+4'27	—1'40	+0'48	+4'38
	Talcher . .	—0'21	—0'84	—1'26	+2'78	—0'60	+5'12	—3'73	—1'37	—5'03	+3'78	—1'29	—0'22	—2'87
	Narsinghpur . .	—0'23	—0'31	—0'81	+2'06	+0'82	—3'16	—1'44	—0'25	—4'09	+10'12	—1'52	—0'07	+1'12
	Angul . .	—0'21	—0'88	—1'35	+2'83	—0'67	—2'04	—3'86	—5'25	—6'44	+1'50	—1'51	—0'39	—18'27

TABLE XVII.—Comparison of the monthly and total rainfall (in inches) in 1899 with the averages of past years—contd.

PROVINCE.	STATION.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	TOTAL.
		Inches.	Inches.	Inches.	Inches.	Inches.	Inches.	Inches.	Inches.	Inches.	Inches.	Inches.	Inches.	Inches.
BENGA.—contd.	Dhenkanal .	—0'30	—0'02	—1'20	+0'52	+1'09	+4'36	—6'79	—7'77	—7'04	+5'32	—1'34	—0'30	—13'47
	Bispara .	—0'32	—0'29	—0'82	+2'67	+0'53	—6'91	—5'74	—5'41	—6'55	—0'66	—1'16	—0'30	—24'96
	Kunjabangar .	—0'23	—0'17	—1'37	+1'80	—0'63	—2'14	—6'21	—0'23	—7'67	+2'06	—1'37	—0'13	—16'29
	Banki(Charchika)	—0'20	—0'53	—0'08	+2'35	—1'32	—4'69	—4'78	+1'19	—6'23	+2'98	—1'75	—0'44	—13'50
	Cuttack .	—0'36	—0'37	—1'27	+3'58	+1'84	+0'28	—1'44	—6'61	—3'65	+5'09	—1'44	—0'37	—4'72
	Baramba .	+0'04	—0'43	—0'95	+0'89	+3'15	—1'08	—1'68	+1'55	—7'75	+3'56	—1'50	—0'03	—4'23
	False Point .	—0'41	—0'42	—1'02	+0'28	+1'93	—0'54	—6'20	—0'89	—6'33	—1'30	—2'96	—0'52	—18'38
	Puri .	+0'06	—0'99	—0'60	+2'04	—0'30	—4'53	—4'04	—1'85	—6'45	+0'73	—2'74	—0'60	—19'27
	Darjeeling	+2'34	—0'54	+0'77	+0'99	+4'90	+2'94	+12'08	—2'62	+18'73	—4'16	—0'05	—0'13	+35'25
	Gantak .	+1'84	+1'79	+4'32	—2'06	—11'79	?	+7'97	—0'97	—1'94	—3'52	+1'29	+3'22	?
	Mongpoo .	+1'84	—0'23	+0'64	+2'52	+6'76	+0'58	+11'48	+2'09	+13'63	—1'01	—0'17	—0'14	+37'99
	Pedong .	+1'00	—0'31	+0'23	+2'83	+2'21	+2'07	+0'76	—3'10	+5'87	—1'16	—0'28	+1'65	+11'77
	Buxa .	—0'34	+0'42	—0'98	—1'69	—3'38	+1'73	—15'86	+5'57	—12'93	+8'48	+0'69	+0'42	—17'87
	Jalpaiguri .	+0'28	—0'32	—0'19	—1'57	—0'39	—1'28	—2'95	+2'73	—2'37	—3'33	—0'16	—0'08	—9'63
	Cooch Behar .	+0'22	—0'35	+0'82	—1'94	—6'89	+9'92	—0'40	+1'07	+1'06	—2'66	—0'15	+0'26	+0'96
	Kishanganj .	+1'04	—0'45	—0'53	+2'82	—1'42	+7'43	+2'41	+5'47	+13'60	—3'15	—0'05	—0'11	+27'06
	Purnea .	+0'20	—0'29	—0'39	+1'57	—1'32	+3'82	+9'02	+15'31	+4'79	—3'32	—0'08	—0'11	+29'20
	Rangpur .	?	—0'39	+2'27	+0'39	—2'47	—10'71	—2'07	+8'52	+9'83	—3'03	—0'26	—0'09	+1'48?
	Dinajpur .	+0'21	—0'55	—0'52	+2'87	—2'05	+2'09	+12'52	+18'18	+10'72	—3'09	—0'18	—0'08	+40'12
	Malda .	+1'41	+0'17	—0'81	—0'28	—0'63	+7'81	+8'33	+2'29	—3'73	—2'11	—0'22	—0'27	+11'96
	Bogra .	+1'97	+0'42	—1'01	—0'38	+0'52	—0'88	+6'38	+6'15	+1'61	+1'01	—0'91	—0'09	+14'79
	Rampur Boalia .	+1'05	—0'65	+0'60	—1'29	+3'23	+1'62	—0'17	+1'47	—2'01	—1'34	—0'34	—0'07	+2'10
	Pubna .	+1'71	—0'58	—1'63	—0'07	+0'84	—0'09	+5'45	—1'36	—6'05	—0'85	—0'66	—0'08	—3'37
	Suri .	+0'36	—0'81	—0'80	—0'68	+0'48	+5'16	+11'41	—6'28	—3'91	—0'15	—0'36	—0'13	+4'29
	Bankura .	+0'58	—0'13	—1'31	+0'63	—0'31	+0'41	+3'64	—4'43	—3'12	—1'07	—0'55	—0'14	—5'80
	Burdwan .	+1'08	+1'63	—1'33	+0'35	—2'53	+1'59	+11'77	—1'18	+0'75	—0'33	—0'71	—0'13	+10'96
	Hooghly .	+0'04	—0'90	—1'48	+1'95	+6'45	+2'20	+12'16	—6'40	+2'97	—0'74	—0'73	—0'20	+15'32
	Howrah .	—0'33	—1'10	—1'51	+0'39	+5'81	+6'08	+7'82	—4'34	—0'28	—1'58	—0'56	—0'20	+10'20
	Midnapore .	—0'23	—0'95	—1'43	+0'68	+1'11	+3'14	+9'65	—2'68	+3'23	—0'92	—0'63	—0'21	+10'76
	Tamluk .	—0'16	—1'15	—1'45	+1'27	+2'37	+3'88	+9'81	+2'24	+7'52	+0'95	—0'52	—0'20	+24'56
	Berhampore .	+1'49	—0'61	—0'97	—0'76	—1'93	+0'39	+2'88	—0'24	+0'44	—1'41	—0'44	—0'10	—1'26
	Krishnagar .	+0'87	—0'80	—1'16	+1'19	+4'31	+0'79	+12'98	—4'33	—2'41	—1'53	—0'81	—0'12	+8'98
	Faridpur .	+1'71	+0'35	+0'42	+1'07	—0'20	+4'75	+2'63	—0'18	+0'88	+2'27	—1'13	—0'09	+12'48
	Jessore .	+0'44	—0'57	—1'71	—0'48	+1'69	—1'40	+9'27	+1'42	—1'14	—1'57	—1'28	—0'15	+4'52
	Basirhat .	—0'26	—0'94	—1'72	+4'58	+1'27	—2'31	+0'09	—3'68	—2'95	—1'60	—0'58	—0'16	—8'26

TABLE XVII.—Comparison of the monthly and total rainfall (in inches) in 1899 with the averages of past years.—contd.

PROVINCE.	STATION.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	TOTAL.
		Inches.	Inches.	Inches.	Inches.	Inches.	Inches.	Inches.	Inches.	Inches.	Inches.	Inches.	Inches.	Inches.
BENGAL—contd.	Khulna . .	+0'17	+0'10	+0'10	+1'42	+3'60	+5'08	+8'92	—1'72	—2'46	—0'19	—0'83	—0'23	+13'96
	Barisal . .	+0'35	—0'20	+1'12	+0'80	+4'48	+0'87	+5'24	—3'31	—2'48	+7'90	—1'15	—0'32	+13'30
	Alipore (Obsy.) .	—0'11	—1'05	—1'29	+1'27	+4'02	+6'05	+9'52	—3'60	—0'12	—0'68	—0'74	—0'37	+12'90
	Saugor Island .	+0'87	—0'99	—0'95	+0'02	+9'82	—1'10	—0'35	+1'59	+1'51	—0'87	—1'48	—0'07	+8'00
	Mymensingh .	+2'58	—0'36	—1'01	+4'68	—0'83	—7'58	+6'47	+3'18	+6'34	—0'25	—0'84	—0'05	+12'33
	Kishorganj .	+2'04	+0'23	—0'54	+2'91	+5'31	—1'08	+5'49	+0'73	+3'76	+1'93	—0'78	+0'36	+20'36
	Atia (Tangail) .	+0'95	+0'48	—1'02	—1'61	+0'97	+4'92	+2'93	+0'31	—2'22	+1'65	—0'55	—0'09	+6'72
	Dacca . .	+1'29	+0'83	+0'05	+0'70	+2'65	+5'01	+3'52	+4'94	—3'89	—0'87	—0'92	—0'19	+13'12
	Comilla . .	+1'11	+1'26	—2'42	+2'51	+1'62	—3'17	—1'96	+4'04	+4'62	+0'71	—1'31	—0'24	+6'77
	Agartalla .	—0'48	+0'62	—2'48	—3'93	—3'81	—3'05	—0'50	—2'70	—3'33	+4'45	—1'45	+1'23	—15'43
	Noakhali . .	—0'05	+2'59	—2'04	+3'80	+7'65	—8'25	+19'82	+11'13	+2'23	+11'23	—1'76	—0'39	+45'95
	Demagiri .	—0'47	—0'71		Observatory closed.									
	Rangamatia Hills	—0'48	—0'85	—2'44	+6'36	+2'95	—0'90	—0'71	+2'23	+1'59	+7'36	+0'59	—0'54	+9'73
	Chittagong .	—0'32	—0'41	—1'14	+1'38	+4'41	+8'70	+5'20	—1'9	—0'85	+18'37	+0'70	—0'62	+33'51
	Cox's Bazar .	—0'39	—0'43	—1'14	+0'11	+4'89	+16'20	+18'87	+2'04	+6'50	+19'43	+0'48	—0'33	+66'23
	Sylhet . .	+1'08	+1'52	—1'09	—4'54	+5'59	+6'91	+5'53	+1'07	+6'11	—0'03	—1'23	+0'77	+21'69
	Silchar . .	+0'11	—1'42	—2'50	+0'40	—3'64	+13'44	+4'27	—3'73	+3'74	+6'68	—1'37	—0'44	+15'54
	Cherra Poonjee	+0'53	+0'82	+29'99	+10'13	+46'13	+43'29	—55'56	+22'56	+58'85	+22'72	—1'69	+0'01	+177'78
	Tura . .	—0'16	+0'69	+1'87	+1'26	—2'06	—2'98	—5'30	+4'4	—1'07	—1'24	—0'46	—0'08	—5'59
	Shillong . .	+0'64	+0'42	—0'43	+0'80	+3'85	—2'13	—5'38	+1'57	+2'03	+0'25	—0'79	—0'07	+0'76
	Dhubri . .	—0'14	—0'44	+0'43	—0'72	—2'38	+0'07	—5'05	+10'86	+2'60	—1'40	—0'16	—0'11	+3'56
ASSAM.	Goalpara . .	—0'20	+1'97	+1'80	—0'11	—5'65	+0'95	—2'57	+5'48	+1'63	—1'41	—0'11	+0'15	+1'93
	Kulsi . .	+0'09	+0'83	+1'70	+0'18	—1'93	+0'20	+3'41	+3'54	+0'12	+0'75	—0'28	—0'02	+8'59
	Gauhati . .	—0'26	+0'83	—0'40	+1'69	+2'13	+1'89	+3'68	+0'08	+0'49	+1'22	—0'54	+0'13	+10'94
	Nowgong . .	+0'06	+1'06	+0'83	+1'34	+3'07	+6'75	—0'70	+8'35	+2'42	+0'75	—0'36	+0'56	+24'13
	Tezpur . .	+0'15	—0'02	+1'06	—0'18	+4'70	—0'80	+0'37	+0'36	+0'21	+3'94	+1'86	—0'05	+11'60
	Chardner . .	+0'22	+1'11	+4'54	—1'07	+9'03	+0'16	+2'77	+0'91	+0'93	+9'53	—0'16	+0'87	+28'84
	Sibsagar . .	—0'31	+0'91	+1'62	—2'48	+2'03	—0'78	—2'40	+2'21	+1'30	—1'65	—0'52	—0'22	—0'29
	Dibrugarh . .	—0'20	+0'25	—0'91	+1'42	+0'34	+5'93	—4'31	+5'39	+6'49	—1'15	—0'34	—0'29	+12'62
	Kohima . .	+0'31	—0'09	—1'11	+0'05	—0'59	+0'36	+8'49	—2'19	+2'54	—1'88	—1'06	+0'01	+4'84
	Saugor . .	—0'68	—0'04	—0'24	0	—0'41	—2'16	—3'71	—9'30	—6'61	—1'27	—0'36	—0'57	—25'35
CENTRAL PROVINCES.	Damoh . .	—0'57	—0'23	—0'22	+0'23	—0'22	—0'01	—2'81	—7'09	—6'28	—1'63	—0'34	—0'45	—19'62
	Jubbulpore .	—0'64	—0'31	—0'52	—0'13	+0'44	—4'50	—0'46	—7'32	—4'82	—1'64	—0'40	—0'26	—20'56
	Narsinghpur .	—0'42	—0'16	—0'29	—0'06	—0'40	—5'09	—7'87	—1'81	—8'40	—1'57	—0'27	—0'38	—26'72
	Hoshangabad .	—0'33	+0'09	—0'23	+0'15	+0'08	—0'75	—6'12	—8'62	—8'09	—1'44	—0'43	—0'47	—26'16

TABLE XVII.—Comparison of the monthly and total rainfall (in inches) in 1899 with the averages of past years—contd.

PROVINCE.	STATION.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	TOTAL.
		Inch.	Inches.	Inches.	Inches.	Inches.	Inches.	Inches.	Inches.	Inches.	Inches.	Inch.	Inch.	Inches.
CENTRAL PROVINCES—contd.	Khandwa .	—0'32	—0'14	—0'10	+0'01	+0'26	—3'84	—6'73	—5'32	—5'79	—1'16	—0'17	—0'42	—23'72
	Badnur (Betul). .	—0'46	+0'67	—0'61	+0'10	+0'44	—4'62	—7'42	—7'77	—8'00	—1'91	—0'42	—0'52	—30'52
	Pachmarhi .	—0'57	+0'39	—0'37	—0'08	+0'13	—3'00	—7'92	—13'67	—11'49	—2'07	—0'47	—0'58	—39'70
	Chhindwara .	—0'71	+0'48	—0'49	+0'10	+0'58	—6'20	—7'56	—5'07	—7'61	—1'90	—0'46	—0'36	—29'20
	Seoni .	—0'67	—0'08	—0'48	+0'58	—0'13	—2'97	—6'03	—8'38	—6'83	—2'15	—0'47	—0'61	—28'22
	Balaghat .	—0'53	—0'18	—0'29	+0'51	—0'35	—6'62	—11'61	—6'01	—8'10	—2'11	—0'55	—0'25	—36'09
	Mandla .	—0'56	+0'32	—0'80	—0'18	+0'12	—2'91	—7'08	—5'94	—3'96	—1'66	—0'31	—0'34	—23'30
	Bilaspur .	—0'49	+0'32	—0'69	—0'07	+0'29	—5'09	—7'18	+8'98	—6'91	—1'67	—0'64	—0'29	—13'44
	Sarangarh .	—0'19	—0'43	—0'72	+1'43	+0'40	—2'21	—3'31	—1'82	—6'45	—2'99	—0'79	—0'16	—17'24
	Raigarh .	—0'12	—0'31	—0'56	+2'23	—0'34	—2'19	—11'47	—8'19	—6'82	—2'35	—0'68	—0'23	—31'03
	Sambalpur .	—0'56	—0'57	—0'91	+1'07	—0'55	—2'31	+3'71	—5'64	—7'48	—1'97	—0'47	—0'27	—15'95
	Raipur .	—0'27	—0'27	—0'64	+1'41	+1'57	—5'55	—8'81	—1'93	—6'64	—2'04	—0'69	—0'22	—24'18
	Dhamtari .	—0'21	—0'30	—0'49	+1'06	—0'09	—4'86	—8'76	+4'28	—5'49	—1'90	—0'41	—0'13	—17'30
	Bhandara .	—0'86	—0'53	—0'60	—0'01	—0'15	—3'87	—14'14	—4'46	—5'55	—1'84	—0'77	—0'36	—33'14
	Naypur .	—0'61	—0'25	—0'59	—0'03	—0'14	—3'80	—10'02	—6'90	—6'15	—2'29	—0'55	—0'46	—31'79
	Arvi .	—0'55	—0'21	—0'42	+0'19	—0'51	—4'23	—10'48	—2'82	—5'20	—2'34	—0'40	—0'42	—27'39
	Wardha .	—0'37	—0'05	—0'44	+1'84	+0'10	—3'94	—12'26	—2'62	—4'93	—2'33	—0'63	—0'36	—25'99
	Brahmapuri .	—0'43	—0'16	—0'95	—0'09	—0'22	—4'37	—16'39	—4'07	—5'42	—2'20	—0'62	—0'41	—35'33
	Chanda .	—0'27	—0'61	—1'21	+1'78	—0'59	—2'85	—14'55	—1'07	—8'27	—2'22	—0'82	—0'33	—31'01
	Sironcha .	—0'30	—0'34	—0'59	+0'55	—0'69	—2'06	—11'32	—4'77	—5'85	—2'43	—0'70	—0'26	—28'76
	Baster (Jagadapore). .	—0'11	—0'21	—0'75	+1'02	+4'58	—4'78	—9'86	—0'09	—1'58	—2'66	—0'96	—0'23	—15'63
	Chikalda .	—0'57	—0'25	—0'52	+1'29	+2'03	—4'86	—10'60	—14'54	—10'11	—4'34	—0'74	—0'87	—45'08
	Ellichpur .	—0'43	—0'14	—0'36	+0'15	+0'80	—1'35	—6'36	—4'28	—3'50	—2'40	—0'62	—0'56	—19'05
BERAR.	Amraoti .	—0'47	+0'21	—0'27	+0'68	+0'20	—2'98	—6'51	—3'97	—3'34	—1'84	—0'40	—0'49	—19'18
	Akola .	—0'49	+0'07	—0'44	+0'84	—0'20	—1'07	—7'37	—4'57	—3'09	—2'27	—0'49	—0'65	—19'73
	Buldana .	—0'57	—0'06	—0'27	+1'49	—0'06	—1'66	—6'34	—5'88	—4'21	—2'32	—0'53	—0'50	—20'91
	Basim .	—0'33	+0'22	—0'24	+0'91	+0'26	—1'12	—7'98	—4'64	—6'16	—2'13	—0'85	—0'50	—22'56
	Yeotmal .	—0'27	+1'29	—0'53	—0'02	—0'42	—1'01	—11'86	—4'82	—4'60	—2'59	—0'63	—0'43	—25'89
	Wun .	—0'33	—0'17	—0'95	+3'03	+0'17	+0'17	—11'99	—4'40	—2'86	—1'78	—0'82	—0'33	—20'26
	Dhulia .	—0'30	—0'06	—0'04	+0'24	—0'11	—0'89	—3'95	—2'35	—4'19	—1'78	—0'69	—0'35	—14'47
	Nasik .	—0'08	—0'04	—0'04	+0'16	+1'24	+1'06	—6'92	—4'00	—1'96	—3'74	—0'53	—0'22	—15'07
	Igatpuri .	—0'16	—0'08	—0'03	+0'48	—0'98	+6'35	—28'90	—23'22	—14'35	—4'51	—0'43	—0'19	—66'02
	Malegaon .	—0'22	—0'12	—0'04	—0'16	+0'08	—1'91	—3'72	—2'99	—3'95	—2'28	—0'49	—0'38	—16'18
BOMBAY.	Ahmednagar .	—0'30	—0'14	—0'16	+0'76	—0'80	+1'40	—2'74	—3'13	—3'43	—3'22	—0'97	—0'48	—13'21
	Poona .	—0'20	—0'05	—0'14	+1'53	—1'20	—1'22	—5'42	—3'05	—1'16	—3'55	—0'90	—0'22	—15'58

TABLE XVII.—Comparison of the monthly and total rainfall (in inches) in 1899 with the averages of past years—contd.

PROVINCE.	STATION.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	TOTAL.
		Inch.	Inch.	Inches.	Inches.	Inches.	Inches.	Inches.	Inches.	Inches.	Inches.	Inches.	Inch.	Inches.
BOMBAY— concl'd.	Lonavla . .	-0'07	-0'05	-0'07	+4'54	-0'65	-5'86	-54'94	-24'96	-18'31	-4'22	-0'85	-0'18	-105'62
	Satara . .	-0'30	-0'10	-0'11	+3'10	-1'16	-2'33	-10'39	-5'37	+0'36	-3'30	-1'48	-0'45	-21'53
	Mahabaleshvar .	-0'34	-0'04	-0'33	+15'41	+0'28	-9'87	-64'32	-41'67	-21'80	-4'88	-1'34	-0'34	-129'24
	Sholapur . .	-0'07	-0'08	-0'19	-0'48	-0'47	-3'31	-4'15	-3'89	+1'10	-3'79	-0'94	-0'33	-16'60
	Kolhapur . .	-0'07	-0'08	-0'11	-0'66	-2'11	+1'03	-8'55	-5'95	+0'61	-3'84	-0'91	-0'21	-20'85
	Belgaum . .	-0'07	-0'03	-0'29	+1'60	-2'42	+1'69	-11'24	-6'83	+3'06	-3'02	-1'40	-0'26	-19'21
	Gokak . .	-0'08	-0'01	-0'41	+2'83	-0'18	-1'08	-1'75	-2'16	+1'53	-5'51	-1'09	-0'64	-8'55
	Dharwar . .	-0'13	-0'02	+0'65	+1'51	-1'37	-0'26	-3'79	-3'82	+2'58	-2'85	-1'89	-0'41	-9'80
	Hubli . .	-0'10	-0'02	-0'24	+2'34	-0'61	-0'12	-3'23	-2'80	+1'94	-1'82	-1'26	-0'22	-6'14
	Nargund . .	-0'19	-0'03	+1'24	+0'52	-0'82	-1'15	-1'59	-2'72	+4'70	-6'07	-0'94	-0'29	-7'34
	Mundargi . .	-0'22	0	-0'04	+3'25	-0'99	-0'85	+1'39	-1'32	+2'31	-4'02	-1'40	-0'10	-1'99
	Kalghatgi . .	-0'09	0	-0'30	+1'04	+0'06	+2'02	-5'51	-3'23	-1'13	-1'56	-1'22	-0'21	-10'13
	Bijapur . .	-0'06	-0'05	+0'02	+0'50	+0'27	-1'07	-2'19	-0'67	+4'07	-4'56	-1'35	-0'63	-5'62
	Honavar . .	-0'18	0	-0'11	+4'15	+3'16	+0'72	-33'49	-11'91	-4'27	-3'72	-1'10	-0'13	-46'88
	Karwar . .	-0'13	0	-0'04	+4'88	+1'93	-3'97	-31'09	-6'64	-6'98	-2'56	-1'48	-0'12	-46'20
	Goa . .	-0'18	0	-0'02	+4'94	+0'65	-3'87	-27'12	-11'29	-4'80	-3'28	-1'16	-0'09	-46'22
	Vengurla . .	-0'21	0	-0'06	+3'37	-0'29	-4'83	-29'44	-9'66	-6'19	-0'18	-0'94	-0'17	-49'60
	Ratnagiri . .	-0'69	-0'01	-0'01	+0'26	-0'42	-2'18	-24'79	-10'03	-3'24	-1'74	-0'71	-0'07	-43'63
	Colaba (Obsy.).	-0'13	-0'02	-0'01	+1'54	-0'51	+0'15	-20'05	-9'83	-7'33	-1'81	-0'50	-0'05	-38'55
	Byculla (J. J. Hospital). Thana . .	-0'17	-0'01	-0'01	+0'87	-0'10	+0'19	-24'98	-11'37	-9'05	-2'54	-0'21	-0'04	-47'42
	Thana . .	-0'20	-0'05	-0'06	+0'36	+0'40	-4'49	-28'79	-13'43	-8'76	-2'94	-0'25	-0'05	-58'26
	Matheran . .	-0'09	-0'01	-0'01	+1'46	-0'22	+3'87	-61'04	-32'47	-23'18	-4'92	-1'00	-0'05	-117'66
	Surat . .	-0'04	-0'02	0	-0'01	-0'14	+6'64	-15'39	-8'05	-6'15	-1'73	-0'17	-0'03	-25'09
	Broach . .	-0'05	-0'02	-0'02	-0'01	-0'13	+0'46	-15'72	-7'82	-6'17	-1'62	-0'18	-0'04	-31'32
	Kaira . .	-0'03	-0'15	-0'02	-0'04	-0'18	-0'71	-14'66	-8'96	-3'21	-0'57	-0'35	-0'05	-28'93
	Bariya . .	-0'05	-0'23	0	0	+0'51	+1'31	-16'40	-11'68	-8'52	-0'99	-0'19	-0'10	-36'34
	Godhra . .	-0'04	-0'13	-0'01	-0'01	+0'54	+0'60	-14'80	-11'39	-7'45	-0'99	-0'16	-0'06	-33'90
	Dohad . .	-0'07	-0'17	-0'01	-0'03	+0'29	+3'39	-7'61	-8'20	-1'91	-1'19	-0'19	+0'14	-15'56
	Ahmedabad . .	-0'03	-0'08	-0'01	-0'02	-0'45	-0'93	-11'77	-8'54	-2'91	-0'62	-0'21	-0'03	-25'60
	Idar . .	-0'05	-0'14	-0'03	-0'02	-0'05	+0'08	-16'48	-11'54	-5'56	-0'05	-0'25	-0'07	-34'16
	Deesa . .	-0'16	-0'15	-0'09	-0'04	+0'49	-1'37	-9'56	-7'84	-3'60	-0'50	-0'15	+0'03	-22'94
	Wadhwan . .	-0'05	-0'06	-0'04	-0'01	-0'05	+0'06	-7'97	-3'42	-2'40	-0'49	-0'53	-0'03	-14'99
	Palanpur . .	-0'12	-0'20	-0'07	-0'01	-0'11	-0'30	-11'00	-10'46	-5'21	-0'48	-0'11	-0'08	-28'15
	Rajkot . .	-0'05	-0'10	-0'01	-0'01	+0'12	+0'68	-11'39	-5'95	-2'64	-0'70	-0'37	-0'06	-20'48
	Songad . .	-0'04	-0'08	-0'06	-0'04	-0'14	+0'88	-9'07	-4'21	-3'39	-1'75	-0'25	-0'03	-18'18
	Jetalsar . .	-0'05	-0'12	0	0	+0'20	-5'54	-13'57	-2'44	-0'76	-1'07	-0'94	-0'01	-24'30

TABLE XVII.—Comparison of the monthly and total rainfall (in inches) in 1899 with the averages of past years—contd.

PROVINCE.	STATION.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	TOTAL.
		Inch.	Inch.	Inches.	Inches.	Inches.	Inches.	Inches.	Inches.	Inches.	Inches.	Inches.	Inches.	Inches.
HYDERABAD.	Aurangabad (Cantt.)	—0'16	+0'14	—0'08	+1'67	—0'35	—1'51	—6'41	—1'87	—5'90	—2'54	—1'15	—0'70	—18'86
	Hingoli	—0'39	—0'18	—0'29	+1'13	+0'22	—5'37	—7'14	—4'61	—4'12	—2'57	—1'00	—0'43	—24'75
	Parbhani	—0'07	—0'06	—0'26	+2'12	—0'03	—4'40	—6'57	—6'02	—5'38	—2'94	—0'74	—0'27	—24'62
	Nanded	—0'13	—0'24	—0'49	+2'79	—0'18	—5'47	—6'94	—6'07	—7'95	—3'01	—0'82	—0'63	—29'13
	Bheer	—0'12	—0'05	—0'24	—0'23	—0'58	+2'40	—5'75	—4'15	+1'14	—2'99	—1'15	—0'65	—12'37
	Mominabad	—0'21	—0'15	—0'46	+0'35	+0'71	—2'19	—5'88	—6'61	—4'49	—2'94	—1'42	—0'97	—24'26
	Indur (Indur)	—0'06	—0'07	—0'58	+2'64	+1'37	—0'29	—8'62	—4'55	—7'37	—2'37	—1'08	—0'39	—21'37
	Karimnagar (Yel-gandal).	—0'23	—0'09	—0'26	+1'15	+0'66	—0'69	—6'04	—1'22	—3'55	—3'08	—1'10	—0'33	—14'88
	Kandi (Medak)	—0'06	—0'17	—0'54	+2'22	+0'73	—2'75	—4'75	—1'37	—3'90	—2'59	—1'18	—0'20	—14'56
	Shumsabad (Ibra-himpatan).	—0'07	—0'13	—0'50	+1'05	—0'16	—1'21	—3'17	—1'68	—3'08	—2'80	—1'60	—0'18	—13'53
	Sundannully Ibra-himpatan).	—0'03	—0'21	—0'47	+0'65	—0'47	—2'08	—3'63	—2'45	—3'65	—2'91	—1'44	—0'08	—16'77
	Dharasev (Nal-durg).	—0'02	—0'03	—0'30	+0'77	—0'25	—2'72	—5'56	—5'49	—1'91	—3'48	—0'91	—0'41	—20'31
	Bidar (Bidar)	—0'02	—0'12	—0'38	+0'25	+1'08	—0'62	—7'86	—3'62	—7'68	—4'02	—1'52	—0'62	—25'13
	Gulbarga (Gul-barga).	—0'09	—0'15	—0'32	+0'51	+0'96	—1'70	—4'09	—5'37	—1'09	—3'26	—0'71	—0'28	—15'59
	Bolarum	—0'12	—0'14	—0'61	+0'55	—0'30	—01'9	—2'90	—2'94	—3'00	—3'39	—1'06	—0'35	—14'45
	Secunderabad	—0'25	—0'22	—0'40	+0'21	—0'54	—1'13	—4'12	—0'07	—2'03	—3'19	—0'98	—0'23	—12'95
	Hyderabad (Re-sidency).	—0'11	—0'08	—0'29	+0'38	—0'04	+0'73	—4'50	+0'63	—2'86	—3'21	—1'30	—0'45	—11'99
	Zanawada (Hy-derabad).	—0'08	—0'49	—0'77	+1'98	—0'90	—2'37	—3'05	—4'34	—3'94	—2'68	—1'18	—0'01	—17'83
	Bhongir (Nal-gunda).	—0'16	—0'08	—0'49	+0'63	+0'02	+2'09	—3'90	—3'56	—4'33	—3'25	—1'98	—0'13	—15'14
	Hanumkunda (Warangal).	—0'28	—0'21	—0'95	+0'86	+1'04	—0'49	—3'54	—5'43	—6'24	—2'53	—1'22	0	—18'99
	Sirpur Tandur	—0'04	—0'26	—0'48	+2'03	+0'80	—3'89	—10'79	+0'88	—4'89	—2'37	—1'19	—0'76	—20'96
	Palmoor (Mah-bubnagar)	0	—0'16	—0'71	—0'48	+0'83	—0'84	—6'77	—7'05	+4'04	—3'52	—1'02	0	—15'68
	Raichur	—0'03	—0'06	—0'36	+0'42	—0'22	—3'14	—4'31	—3'96	+1'12	—3'86	—1'12	—0'12	—15'64
	Raichur (Cantt.)	0	—0'11	—0'45	+1'09	—0'64	—2'98	—4'27	—4'70	+1'55	—3'05	—1'13	—0'17	—14'86
MADRAS.	Rambha	—0'20	—0'76	—0'97	+3'11	+0'26	+2'69	+2'45	+4'66	—5'74	+8'48	—2'31	—0'89	+10'78
	Gopalpur	—0'11	—0'53	—0'74	+1'73	+0'10	—0'91	—1'67	—3'58	—4'93	+2'96	—4'69	—0'67	—13'04
	Aska	—0'23	—0'60	—1'42	+1'39	—1'15	—2'85	—1'96	—0'67	—0'97	+2'82	—2'25	—0'52	—8'41
	Vizianagram	—0'13	—0'39	—0'91	+0'33	+3'37	+0'14	+2'44	+1'99	+1'17	—2'00	—2'45	—1'16	+2'40
	Bimlipatam	—0'01	—0'43	—0'18	+0'10	+1'20	—2'19	—0'21	—0'14	—2'54	+2'20	—2'73	—1'00	—5'93
	Rayaghadda	—0'14	—0'28	—1'12	+2'51	+0'06	+0'91	—3'33	—3'95	—3'57	—1'19	—1'61	—0'38	—12'09
	Nourangapur	—0'14	—0'35	—0'46	+2'88	+3'00	—3'60	—11'88	+0'57	—8'15	—2'86	—0'85	—0'08	—21'92
	Gunipur	—0'08	—0'61	—1'25	+2'54	+0'35	+2'13	+1'29	—2'97	—3'28	+0'15	—1'93	—0'33	—3'99
	Jaipur	—0'07	—0'10	—0'62	+1'93	+0'62	—7'25	—6'16	+0'02	—9'90	—4'34	—1'41	—0'05	—27'33
	Koraput	—0'10	—0'09	—0'57	+1'07	+0'13	—5'30	—4'17	—2'66	—5'53	—3'80	—1'48	—0'19	—22'69
	Malkanagiri	—0'07	—0'06	—0'07	+1'56	+0'58	—3'63	—11'38	+0'17	—7'14	—2'83	—1'01	—0'05	—23'93

TABLE XVII.—Comparison of the monthly and total rainfall (in inches) in 1899 with the averages of past years—contd.

PROVINCE.	STATION.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	TOTAL.
		Inch.	Inches.	Inch.	Inches.	Inches.	Inches.	Inches.	Inches.	Inches.	Inches.	Inches.	Inches.	Inches.
MADRAS—contd.	Narsapatnam .	—0'18	—0'33	—0'98	+1'16	—0'02	+1'03	—3'40	—1'77	+3'50	—5'59	—2'51	—0'82	—9'91
	Vizagapatam .	—0'06	—0'20	—0'34	+0'69	+0'71	—1'41			Observatory closed.				
	Cocanada .	+0'15	—0'28	—0'26	+1'04	—1'39	—1'99	—4'61	—1'20	—5'80	—3'76	—4'15	—0'79	—23'04
	Rajahmundry .	—0'16	—0'23	—0'29	+1'47	—1'56	—2'90	—6'04	—1'81	—2'17	—5'55	—2'00	—0'17	—21'41
	Ellore .	—0'17	—0'09	—0'38	+1'52	—0'02	—1'86	—3'42	—0'73	+1'56	—6'14	—2'43	—0'32	—12'48
	Masulipatam .	—0'20	—0'04	—0'27	+3'76	—1'34	—3'09	—4'18	—1'89	+3'77	—6'98	—4'57	—0'59	—15'62
	Guntur .	—0'26	—0'15	—0'49	+5'68	—0'88	—1'55	—2'74	—2'07	—2'42	—6'00	—2'52	—0'41	—13'81
	Vinukonda .	—0'21	—0'02	—0'51	+6'81	—0'91	—2'18	—1'28	—1'08	+0'08	—6'04	—3'45	—0'59	—9'38
	Ongole .	—0'22	—0'07	—0'24	+3'10	—0'72	—1'55	—1'86	—1'24	—0'16	—7'43	—7'57	—1'01	—18'97
	Nellore .	—0'42	—0'08	—0'20	+2'96	—0'92	—1'10	—1'95	+0'26	—1'44	+6'51	—9'08	—3'33	—8'80
	Udayagiri .	—0'35	—0'24	—0'49	+3'93	+0'13	—1'07	—1'71	—1'17	—1'85	—5'03	—6'41	—2'01	—16'27
	Tada .	—0'57	—0'46	—0'21	+2'61	—1'44	—1'14	—1'86	—1'44	+5'77	+16'54	—10'26	—3'96	+3'58
	Kurnool .	—0'05	—0'03	—0'38	+1'89	—1'62	—2'93	—4'38	—0'66	—1'26	—3'23	—0'97	—0'16	—13'78
	Nandyal .	—0'08	—0'03	+0'13	+0'31	+3'01	—2'66	—5'09	—2'66	—4'34	—4'08	—1'07	—0'20	—16'76
	Bellary .	—0'11	—0'03	—0'46	+1'47	—1'12	—0'06	—1'35	—1'33	+4'13	—2'45	—1'11	—0'22	—2'64
	Gooty .	—0'04	—0'05	—0'08	+1'46	—0'85	—1'51	—2'75	+1'26	+3'48	—3'71	—0'90	—0'12	—3'81
	Adoni .	—0'04	0	—0'29	+1'50	—0'35	—3'82	—3'34	—1'92	+4'24	—3'64	—0'88	—0'17	—8'71
	Dharmavaram .	—0'01	—0'11	—0'18	+0'44	—0'95	—1'97	—1'65	—1'30	+2'47	—2'78	—0'57	—0'26	—6'88
	Cuddapah .	—0'16	—0'04	—0'19	+0'60	+2'15	—2'57	—3'43	—3'10	+1'09	—2'84	—2'69	—0'76	—11'94
	Madanapalle .	—0'13	—0'14	—0'35	+6'17	—0'17	—2'04	—2'00	—2'63	+3'73	+0'68	—3'74	—0'97	—1'59
	Chittoor .	—0'29	—0'20	—0'34	+3'83	—1'34	—1'50	—2'29	—3'58	—2'33	+1'24	—4'56	—1'56	—12'92
	Vellore .	—0'51	—0'33	—0'18	+6'23	—0'64	—2'11	—2'79	—3'77	+1'19	—1'77	—5'74	—2'17	—12'59
	Chandragiri .	—0'20	—0'23	—0'24	+2'25	+0'38	—0'96	—1'51	—1'22	—0'64	—0'06	—6'79	—2'16	—11'38
	Arcot .	—0'37	—0'45	—0'33	+5'35	—0'14	—2'73	—3'03	—0'40	—0'80	+1'20	—5'89	—2'38	—9'97
	Madras .	—0'80	—0'28	—0'39	+2'18	—1'08	—1'55	+0'30	—2'13	+1'24	+11'45	—12'25	—4'83	—8'14
	Palmaner .	—0'16	—0'18	—0'40	+4'57	+0'15	—2'51	—2'61	—4'42	+0'49	—0'56	—4'28	—0'87	—10'77
	Saidapet .	—0'51	—0'19	—0'32	+3'04	—0'02	—2'09	+2'48	—3'14	—0'50	+15'44	—13'66	—5'99	—5'46
	Chingleput .	—0'44	—0'31	—0'13	+3'99	—0'20	—1'40	+1'18	—1'89	—0'97	+7'37	—7'84	—2'59	—3'23
	Conjeeveram .	—0'44	—0'30	—0'12	+3'15	—1'01	—1'20	—1'16	—1'56	—1'66	+3'49	—7'03	—1'72	—9'56
	Tindivanam .	—0'43	+0'73	—0'12	+6'80	+1'07	—1'54	+0'12	—3'92	+0'21	+4'77	—6'29	—2'68	—1'28
	Cuddalore .	—0'84	+1'00	—0'38	+3'73	—1'03	—0'28	—1'44	—2'25	+2'37	+15'05	—9'48	—3'60	+2'85
	Vriddahchalam .	—0'28	—0'31	—0'30	+2'51	+2'02	—1'17	+0'52	—3'69	+0'01	+5'99	—5'06	—2'76	—2'52
	Udayarpalaiyam .	—0'25	—0'32	—0'34	+3'19	—1'75	—0'86	—2'37	—0'46	—0'61	+9'49	—5'24	—2'23	—1'75
	Salem .	—0'26	—0'21	—0'87	+3'87	—0'56	—2'76	—3'04	—5'05	+6'11	—3'96	—2'35	—0'44	—9'52
	Atur .	—0'29	—0'28	—0'77	+1'41	+0'28	—1'78	—2'20	—2'07	—0'55	—0'04	—4'48	+0'38	—10'39

TABLE XVII.—Comparison of the monthly and total rainfall (in inches) in 1899 with the averages of past years—contd.

PROVINCE.	STATION.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	TOTAL.
		Inch.	Inches.	Inches.	Inches.	Inches.	Inches.	Inches.	Inches.	Inches.	Inches.	Inches.	Inches.	Inches.
MADRAS—contd.	Shevaroy Hills.	—0'34	—0'24	—0'84	+5'52	—2'01	—2'27	—3'02	—7'44	+6'37	—2'94	—5'94	—1'13	—14'28
	Kumbakonam.	—0'35	—0'47	—0'52	+2'42	+0'98	—2'22	—2'37	—2'02	+0'39	+8'02	—5'43	—2'62	—4'19
	Tirupatur.	—0'15	—0'33	—0'50	+2'43	—0'34	—2'62	—2'06	—2'94	—4'45	+0'90	—1'9'	—1'36	—13'33
	Hosur.	—0'20	—0'26	—0'49	+1'35	+0'79	—2'18	—2'46	—2'10	+4'28	—1'25	—3'59	—0'63	—6'74
	Tranquebar.	—0'80	—0'43	—0'13	+4'59	+0'50	—0'91	—0'26	—2'34	+0'22	+22'36	—11'58	—9'77	+1'45
	Negapatam.	—0'51	—0'70	—0'07	+4'71	+0'57	—0'46	—0'44	—1'76	—1'09	+27'05	—4'70	—8'11	+14'49
	Tanjore.	—0'41	—0'40	—0'46	+4'58	+1'03	—1'35	—0'86	—4'02	+1'57	+4'01	—3'69	—2'50	—2'50
	Patukota.	—0'61	—0'44	—0'49	+10'04	+0'99	—1'43	—1'53	—4'86	+2'96	+4'25	—2'40	—3'27	+3'21
	Trichinopoly.	+0'07	—0'57	—0'62	+7'80	—0'39	—1'24	—0'56	—4'14	—1'21	—2'64	—4'59	—1'77	—9'86
	Karur.	—0'22	—0'11	—0'33	+2'45	—0'69	—0'84	—0'93	—2'71	+2'64	—2'53	—2'87	—1'20	—7'34
	Coimbatore.	—0'22	+0'18	—0'58	+2'90	—2'01	—1'28	—0'96	—1'15	+0'13	+5'36	—3'15	—0'79	—1'57
	Kollegal.	—0'14	—0'11	—0'93	+0'49	—1'55	—0'93	—1'93	—4'39	+6'32	—4'67	—2'55	—0'12	—10'51
	Dindigul.	—0'48	—0'42	—0'57	+6'17	—1'78	—1'80	—1'33	—0'68	+3'65	—0'23	—4'54	—0'59	—2'60
	Madura (Obsy.)	0'45	—0'39	—0'70	+6'95	—2'00	—1'63	—1'59	—4'00	—1'66	—1'07	—4'53	—1'92	—12'99
	Vattanam.	—0'40	—0'86	—0'85	+8'51	—1'63	—0'86	—0'96	—1'64	—1'51	+8'67	—5'24	—4'21	—0'98
	Periyakulam.	—0'62	+2'28	—1'90	+2'58	—2'31	—1'06	+1'05	—1'22	—1'13	+1'36	—4'32	—1'18	—6'47
	Tinnevely.	+0'06	+1'29	—1'18	+4'33	—1'06	—0'60	—0'23	—0'49	+0'14	+0'20	—4'84	—0'58	—2'96
	Tuticorin.	—0'50	—0'11	—0'61	+3'18	—0'90	—0'20	—0'18	—0'33	—0'56	+8'33	—5'13	+2'06	+0'93
	Satur.	—0'32	—0'58	—1'14	+3'85	—1'61	—0'65	+0'13	—1'29	—1'43	—1'90	—1'84	—1'89	—8'67
	Cochin.	+0'75	+5'07	+0'24	+9'94	—0'47	—1'69	—13'48	—5'20	—6'47	—2'50	—5'06	—0'04	—18'91
	Palghat.	—0'06	+0'25	—0'84	+6'87	—1'30	+1'90	—5'21	—2'88	—1'37	+3'74	—2'83	—0'70	—2'43
	Wellington.	—0'79	+1'02	—2'51	+8'65	—2'53	—0'47	—2'94	—1'31	+3'88	—3'83	—7'44	—2'72	—10'99
	Manantoddy.	—0'20	+0'01	—1'26	+2'82	—1'10	+5'83	—10'39	—6'85	—0'18	—2'44	—2'33	—0'41	—16'50
	Calicut.	—0'13	—0'18	—0'85	+17'13	—4'59	+6'25	—16'01	—10'59	—4'30	+0'99	—3'78	—1'41	—17'47
	Tellicherry.	—0'30	—0'10	—0'44	+11'34	—3'20	—3'69	—24'10	—14'45	—5'40	+1'26	—3'20	—0'87	—43'15
	Cannanore.	—0'36	—0'22	+1'14	+10'85	+2'38	—2'44	—23'59	—3'66	—2'42	—1'79	—3'22	—0'49	—33'82
MYSORE AND COORG.	Mangalore.	—0'14	—0'07	—0'12	+9'72	—3'63	—1'11	—26'43	—10'15	—3'33	—2'84	—2'03	—0'50	—40'63
	Bangalore.	—0'19	—0'13	—0'56	+2'02	—0'20	—2'49	—3'51	—3'93	+5'68	—3'99	—2'15	—0'39	—9'84
	Mysore.	—0'08	—0'15	—0'68	—1'07	—1'16	—0'79	—2'17	—2'53	+3'12	—3'89	—1'74	—0'44	—11'58
	Shimoga.	—0'06	—0'12	—0'10	+2'69	—2'67	+2'93	—4'90	—2'21	+3'18	—0'81	—1'43	—0'37	—3'87
	Mercara.	—0'21	+0'79	—0'78	+1'67	—3'07	+9'54	—18'68	—2'26	—1'83	—5'47	—2'64	—0'31	—23'25
	Kolar.	—0'18	—0'04	—0'57	+3'64	+4'23	—3'36	—3'38	—3'23	+3'50	—1'16	—2'76	—0'53	—3'84
	Tumkur.	—0'16	—0'20	—0'36	—0'02	0	—2'68	—3'68	—1'70	+9'72	—3'15	—1'52	—0'39	—4'14
	Chitaldroog.	—0'19	—0'03	—0'29	+2'57	—1'41	—1'21	—2'03	—1'21	+0'31	—3'18	—2'28	—0'41	—9'36

TABLE XVII.—Comparison of the monthly and total rainfall (in inches) in 1899 with the averages of past years—contd.

PROVINCE.	STATION.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	TOTAL.
		Inches.	Inches.	Inches.	Inches.	Inches.	Inches.	Inches.	Inches.	Inches.	Inches.	Inches.	Inches.	Inches.
MYSORE AND COORG — <i>concl.</i>	Chikmagalur .	—0'22	—0'10	—0'72	+6'90	—2'17	+0'42	—5'74	—2'39	+1'57	—2'43	—2'37	—0'51	—7'76
	Hassan .	—0'70	—0'09	—0'51	+5'06	—1'80	+1'03	—4'52	—2'35	+3'84	—2'47	—1'83	—0'62	—4'96
CEYLON.	Trincomallee .	+1'85	—1'80	+0'61	+1'43	—2'01	—1'52	—0'03	—4'15	—1'81	—0'11	+1'89	+5'02	—0'63
	Colombo .	+3'86	+0'88	—4'06	—4'40	+5'62	+0'98	—4'05	—3'25	—3'59	—1'37	—4'05	—2'13	—15'56
	Ratnapura .	—0'80	—2'93	—2'63	+2'72	+3'63	+5'54	—6'15	—5'11	—8'59	+3'84	—0'46	—2'95	—13'89
	Puttalam .	+8'72	—0'11	+0'39	+2'04	—1'11	—1'44	—0'44	—0'92	—0'96	+1'53	+0'32	—4'42	+3'60
	Anuradhapura .	+26'3	—0'37	—2'56	+2'77	+0'17	—1'66	+0'69	—2'01	—0'50	—0'46	+0'34	—3'00	—3'96
	Mannar .	+0'53	—0'89	—0'80	+0'62	+3'53	—0'62	—0'25	—0'53	—0'94	+4'04	+6'36	—4'90	+6'15
	Jaffna .	+0'28	—1'25	—0'98	+3'64	+0'32	—0'76	—0'71	—1'50	—0'62	+12'58	—3'86	—8'23	—1'09
	Batticaloa .	+7'23	—2'45	+3'62	+0'54	—1'72	—1'11	—1'00	—1'78	—1'16	+5'49	+5'01	+9'93	+22'60
	Hambantota .	+8'15	—1'69	—1'42	+0'33	+1'14	+0'28	—0'81	—1'37	—2'14	—2'30	—0'89	+2'06	+1'34
	Galle .	+1'31	—1'11	—1'24	—2'48	+6'60	+0'78	—0'11	—0'76	—6'37	+4'37	—5'56	—1'94	—6'51
	Kandy .	+4'03	—2'59	—0'18	+9'55	+1'28	+0'86	—1'79	—1'77	+1'13	+4'86	—5'62	—1'74	+7'96
	Nuwara Eliya .	+7'64	—2'13	+0'48	+5'22	+6'32	—0'01	—3'37	—3'51	—0'14	+3'82	—2'81	—4'23	+6'88
	Hakgala .	—1'09	—2'51	+0'19	+4'49	+2'05	—0'29	+0'24	—2'24	—0'10	+1'27	—1'61	—6'47	—6'07
	Padulla .	+6'98	—3'32	+1'48	+1'82	—3'91	—2'45	—1'03	—2'74	—0'41	+3'18	—2'20	—2'47	—5'07
	Kurunegala .	+4'17	—1'86	—2'82	+5'37	+1'01	+0'64	—2'02	—3'46	—2'06	+1'83	—6'62	—1'45	—7'27
	Akyab .	—0'14	—0'19	—0'46	+1'36	+3'08	+0'27	+23'84	—5'40	+3'91	+4'15	+2'92	—0'48	+32'76
	Kyaukpyu .	—0'12	—0'05	—0'25	+0'61	+15'45	+1'89	+5'24	—15'44	—6'55	+3'57	—1'27	—0'54	+2'54
	Sandoway .	—0'08	—0'05	—0'11	—0'63	+19'49	—4'17	+23'59	—6'12	—3'64	—3'43	—1'33	—0'31	+23'21
	Rangoon .	—0'12	—0'27	—0'18	—1'10	+13'45	—4'10	—5'09	+8'33	+2'08	—4'82	—2'46	—0'07	+5'65
	Bassein .	—0'18	—0'23	—0'05	+0'45	+22'89	—0'14	—2'92	—5'38	—1'26	—1'63	—0'27	—0'11	+11'17
BURMA.	Diamond Island	—0'22	—0'09	—0'01	—0'98	+17'45	—7'77	—15'58	—7'40	—9'16	—5'49	—5'13	—0'82	—34'93
	Henzada .	—0'07	—0'21	—0'04	—0'45	+4'72	+1'86	+0'27	—5'87	—1'68	—2'09	+0'38	—0'07	—3'25
	Myanaung .	—0'06	—0'03	—0'01	+0'46	+4'13	—1'22	+0'38	+2'42	+4'12	—2'13	—0'83	—0'12	+7'11
	Prome .	—0'02	—0'01	—0'02	+1'12	+2'52	—1'30	—2'25	—2'86	—1'30	—3'33	—1'19	—0'08	—8'72
	Thayetmyo .	—0'01	—0'03	—0'07	+0'61	—0'34	+0'10	+1'88	—1'65	—2'58	—3'96	—0'79	—0'13	—6'97
	Mandalay .	—0'08	—0'07	—0'21	—1'37	+0'57	+0'74	+2'07	—1'60	+1'06	—1'37	+7'83	—0'11	+7'46
	Shwebo .	+0'27	+0'13	—0'28	—0'74	+3'64	—2'06	—1'59	—1'19	+1'63	+2'85	+0'65	—0'05	+3'26
	Ye-u .	+0'03	0	—0'48	—1'12	+3'15	—0'94	+0'52	—0'39	+3'57	+2'41	+0'64	—0'04	+7'35
	Minbu .	—0'05	—0'02	0	—0'51	+7'77	+1'23	+1'96	+0'73	+1'24	+0'17	+0'74	—0'41	+12'85
	Pyinmana .	—0'06	—0'09	—0'02	—0'70	+2'73	+3'55	+4'53	—0'94	—1'76	—2'19	—0'73	—0'11	+4'21
	Pagan .	—0'04	—0'05	—0'16	—0'57	+0'16	—3'16	—2'09	—0'78	—2'50	—1'11	—0'25	—0'16	—10'71
	Kyauksai .	—0'21	—0'04	—0'15	—1'10	—0'16	—4'05	+0'74	+1'15	+3'02	—0'16	+3'21	—0'31	+1'94

TABLE XVII.—Comparison of the monthly and total rainfall (in inches) in 1899 with the averages of past years—concl'd.

PROVINCE.	STATION.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	TOTAL.
		Inches.	Inches.	Inches.	Inches.	Inches.	Inches.	Inches.	Inches.	Inches.	Inches.	Inches.	Inches.	Inches.
BURMA—concl'd.	Bhamo . .	—0'17	—0'06	—0'63	+0'54	+6'92	+0'31	+8'80	—2'25	—0'27	+3'40	+0'80	—3'40	+16'96
	Kindat . .	+0'17	+0'09	—1'25	—1'42	+12'19	—0'72	+4'96	—2'42	+0'17	+1'35	—1'09	+0'33	+12'36
	Magwe . .	0	—0'04	0	—0'78	+6'11	—0'85	+0'60	+0'39	+2'52	—0'58	+1'38	—0'58	+8'17
	Yemethin .	—0'02	—0'13	—0'11	—1'14	+1'55	—2'65	+2'70	+3'27	—3'71	+1'39	+3'37	—0'46	+4'06
	Fort Sagaing .	—0'05	—0'06	—0'24	—1'03	+1'55	+1'08	+5'41	—2'02	—0'63	—1'57	+2'56	—0'22	+4'78
	Minglo . .	—0'14	—0'04	—0'55	—1'71	+4'00	—0'66	—0'88	+2'98	+6'59	+8'20	+0'01	—0'06	+17'74
	Toungoo . .	—0'07	—0'13	—0'04	—0'44	+2'48	—3'32	+11'23	+1'80	—2'39	+0'73	+1'30	—0'17	+10'98
	Shwegyin .	—0'12	—0'39	—0'28	+0'16	+1'86	+1'53	+1'36	—8'82	—3'49	—5'02	—0'42	—0'08	—13'71
	Moulmein .	—0'18	—0'13	—0'25	—0'07	+3'20	—10'97	+5'05	—8'37	—9'06	—4'58	+0'66	—0'02	—24'72
	Tavoy . .	—0'19	—0'58	+0'91	+3'58	+14'72	—9'93	+15'75	+2'78	+1'15	—5'80	+0'39	—0'09	+22'69
	Mergui . .	—0'44	—1'72	+3'26	+5'78	+6'02	—11'90	—17'15	—0'92	—4'04	—7'72	+0'80	—0'28	—28'31
	Myingyan .	—0'06	—0'07	—0'10	—0'29	—0'68	—2'21	—0'79	+0'67	—0'43	—2'88	+0'94	+0'53	—5'37
BAY IS. LANDS.	Monywa . .	0	—0'01	—0'37	—0'70	—1'20	+1'18	—2'53	+5'90	+0'79	—2'02	+0'58	—0'15	+1'47
	Port Blair .	—0'78	—1'04	—0'25	+2'86	—2'54	—8'53	—9'23	—5'40	+4'66	—3'09	—2'57	—2'57	—28'48
	Cocos Island .	—0'33	+0'31	—0'01	+2'08	—2'75	+1'47	—7'18	—4'55	+1'15	—2'77	—6'36	—1'56	—20'50
KASHMIR	Leh . .	—0'19	—0'13	—0'12	+0'03	+0'29	+0'18	—0'27	+0'56	—0'16	—0'16	—0'10	—0'13	—0'20
	Srinagar . .	—1'91	+1'39	—0'49	+2'29	—0'31	—2'22	—6'37	—5'60	—2'46	—0'16	+0'91	—0'39	—15'32
	Skardu . .	—1'97	+1'00	—0'82	—3'75	—0'52	—0'36	+0'17	—0'87	+0'03	—0'02	—0'05	—0'76	—7'92
	Gilgit . .	—0'12	+0'36	+0'39	—0'66	+0'25	—0'02	—0'70	+0'22	+0'16	—0'06	—0'05	—0'07	—0'30
NAPAL	Katmandu .	+0'54	—0'43	—0'01	—0'07	+0'49	—1'21	—2'42	+0'85	—3'53	—1'89	—0'18	—0'25	—8'11
	Meshed . .	—0'18	+0'46	+0'18	—1'24	+0'34	—0'22	—0'03	—0'02	—0'10	+0'51	+0'67	+1'64	+2'01
EXTRA INDIA.	Teheran . .	+0'22	—0'06	—2'17	—0'24	—0'34	—0'01	—0'51	—0'09	+0'73	—0'04	+0'31	+0'28	—1'92
	Ispahan . .	+0'09	+0'33	—0'56	—0'93	—0'17	0	—0'10	0	0	—0'07	+0'31	+0'44	—0'66
	Bushire . .	—2'49	—0'50	—0'85	—0'58	—0'02	0	0	0	0	—0'10	—0'42	+0'27	—4'69
	Jask . .	—0'61	—0'95	—0'45	—0'06	0	0	—0'03	0	0	—0'07	+0'17	+2'34	+0'34
	Muscat . .	—2'36	—0'85	+0'47	—0'05	0	0	—0'08	0	0	—0'04	—0'94	—0'42	—4'27
	Baghdad . .	—1'33	—2'35	—1'38	—0'85	—0'21	—0'01	0	—0'13	0	+0'06	+0'05	—0'79	—6'94
	Aden . .	+0'10	+0'63	—1'16	—0'66	—0'21	—0'01	0	—0'19	—0'21	—0'02	—0'21	—0'49	—2'43
	Perim . .	—0'50	+0'07	—0'13	—0'03	+2'05	0	—0'02	+0'78	0	—0'09	—0'06	—0'10	+1'97
	Kabul . .	?	—0'72	—1'94	—1'31	—0'27	—0'37	—0'39	—0'17	0	+0'64	+0'27	—0'08	?
	Kashgar . .	—0'42	0	—0'25	—0'12	—1'65	—0'33	—0'38	+0'98	+0'05	—0'07	—0'04	+0'08	—2'15
	Zanzibar . .	—1'61	—2'96	+1'14	+9'12	+10'43	—0'23	+1'96	+1'00	—0'61	—2'91	—2'42	—1'52	+11'39
	Port Victoria (Seychelles). Mauritius .	+0'55	—14'71	—1'68	—0'57	+0'82	—3'46	+1'11	+0'04	+6'91	+3'35	—2'64	—0'06	—10'34
		—4'87	+0'38	+3'87	—0'84	—2'60	—0'34	+0'66	+0'94	+0'24	+0'65	—0'08	—3'55	—5'54

TABLE XVIII.—*Geographical summary of rainfall anomalies in 1899.*

METEOROLOGICAL DIVISION.	Area, square miles.	Number of stations.	Normal rainfall.	Actual rainfall.	Mean excess or defect.	Total excess square miles × 1 inch.	Total defect square miles × 1 inch.
			Inches.	Inches.	Inches.		
I. Punjab Plains	120,000	29	21'71	8'93	—12'78		1,533,600
II. North-Western Provinces and Oudh	83,500	44	38'07	35'43	— 2'64		220,440
IIIa. Rajputana, East	67,000	29	27'02	11'90	—15'12		1,013,040
IIIb. Rajputana, West	58,000	10	12'51	1'32	—11'19		649,020
IV. Central India States	91,000	26	44'26	24'29	—19'97		1,817,270
V. Bihar	30,000	15	44'75	62'65	+17'90	537,000	
VI. Western Bengal	38,000	14	52'75	50'71	— 2'04		77,520
VII. Lower Bengal	54,000	28	65'53	76'63	+11'10	599,400	
VIII. Assam and Cachar	61,000	17	95'19	105'57	+10'38	633,180	
IX. Orissa and Northern Circars	27,000	32	52'75	42'18	—10'57		285,390
X. Central Provinces, South	61,000	19	53'46	26'11	—27'35		1,668,350
XI. Berar and Khandesh	43,000	13	36'41	14'79	—21'62		929,660
XII. Gujarat	54,500	13	33'82	7'33	—26'49		1,443,705
XIII. Sind and Cutch	68,000	10	8'59	0'77	— 7'82		531,760
XIV. North Deccan	48,000	13	30'83	18'79	—12'04		577,920
XV. Konkan and Ghâts	16,000	11	139'95	71'96	—67'99		1,087,840
XVI. Malabar and Ghâts	18,000	8	114'50	89'98	—24'52		441,360
XVII. Hyderabad	74,000	17	34'58	16'53	—18'05		1,335,700
XVIII. Mysore and Bellary	58,000	18	29'28	21'57	— 7'71		447,180
XIX. Carnatic	72,000	36	36'94	31'00	— 5'94		427,680
XX. Arakan	11,000	6	152'36	180'49	+28'13	309,430	
XXI. Pegu	32,500	7	72'24	74'52	+ 2'28	74,100	
XXII. Tenasserim	10,500	4	173'30	162'29	—11'01		115,605
XXIII. Upper Burma	?	13	39'02	44'93	+ 5'91		

On the mean of the whole area represented in the above table there was a defect of 10'41 inches or, excluding the Burmese Peninsula, of 11'14 inches.

TABLE XIX.—Geographical summary of the distribution of rainfall in 1899 according to seasons.

METEOROLOGICAL DIVISION.	JANUARY AND FEBRUARY.			MARCH TO MAY.			JUNE TO OCTOBER.			NOVEMBER AND DECEMBER.		
	Normal average.	Actual average.	Difference.	Normal average.	Actual average.	Difference.	Normal average.	Actual average.	Difference.	Normal average.	Actual average.	Difference.
	Inches.	Inches.	Inches.	Inches.	Inches.	Inches.	Inches.	Inches.	Inches.	Inches.	Inches.	Inches.
North-West Himalayas . . .	6'43	3'73	—2'70	7'21	4'66	—2'55	41'54	34'18	—7'36	1'74	0'13	—1'61
Punjab Plains	2'24	0'78	—1'46	2'75	1'04	—1'71	16'22	7'10	—9'12	0'75	0'02	—0'73
North-Western Provinces and Oudh.	1'48	0'83	—0'65	1'41	1'59	+0'18	35'69	34'19	—1'50	0'45	0	—0'45
Rajputana	0'55	0	—0'55	0'76	0'60	—0'16	21'59	8'53	—13'06	0'39	0'06	—0'33
Central India States . . .	0'97	0'40	—0'57	0'80	0'57	—0'23	41'76	23'31	—18'45	0'73	0'03	—0'70
Bihar	1'19	1'87	+0'68	2'51	3'92	+1'41	40'34	55'32	+14'98	0'34	0	—0'34
Western Bengal and Chota Nagpur.	1'38	1'34	—0'04	3'59	4'07	+0'48	47'13	45'32	—1'81	0'65	0	—0'65
Lower Bengal	1'41	1'79	+0'38	10'64	12'48	+1'84	52'25	62'49	+10'24	0'79	0'03	—0'76
Eastern Himalayas	1'65	2'24	+0'59	18'38	19'24	+0'86	104'53	110'07	+5'54	0'50	0'71	+0'21
Assam and Eastern Bengal .	1'83	2'66	+0'83	22'77	24'00	+1'23	69'30	78'12	+8'82	1'27	0'79	—0'48
Orissa and Northern Circars .	0'74	0'20	—0'54	4'75	6'43	+1'68	44'68	35'90	—8'78	2'42	0'04	—2'38
Central Provinces, South . .	0'86	0'32	—0'54	1'84	1'89	+0'05	49'58	23'90	—25'68	0'90	0	—0'90
Berar and Khandesh	0'53	0'25	—0'28	1'13	2'00	+0'87	33'56	12'56	—21'00	1'19	0	—1'19
Gujarat	0'18	0	—0'18	0'37	0'38	+0'01	32'72	7'50	—25'22	0'35	0'03	—0'32
Sind and Cutch	0'53	0'02	—0'51	0'46	0'55	+0'09	8'22	0'11	—8'11	0'22	0'02	—0'20
North Deccan	0'19	0	—0'19	3'36	3'82	+0'46	25'71	14'96	—10'75	1'55	0	—1'55
Konkan and Ghâts	0'23	0	—0'23	1'71	5'44	+3'73	132'38	63'56	—68'82	0'97	0'02	—0'95
Malabar and Ghâts	0'50	1'12	+0'62	11'39	17'93	+6'54	98'53	70'58	—27'95	4'09	0'36	—3'73
Hyderabad	0'27	0	—0'27	1'95	2'63	+0'68	30'80	13'88	—16'92	1'49	0	—1'49
Ceded Districts and Mysore .	0'25	0	—0'25	4'82	6'20	+1'38	21'63	15'10	—6'53	2'57	0'28	—2'29
Carnatic	0'89	0'38	—0'51	3'97	7'23	+3'26	21'05	20'16	—0'89	10'97	2'84	—8'13
Nilgiris	2'05	2'28	+0'23	9'56	13'17	+3'61	26'85	22'18	—4'67	11'91	1'75	—10'16
Arakan	0'97	0'31	—0'66	16'37	24'29	+7'92	125'56	153'09	+27'53	2'95	2'76	—0'19
Pegu	0'22	0	—0'22	8'46	16'79	+8'33	66'57	57'41	—9'16	2'89	1'57	—1'32
Tenasserim	1'02	0'08	—0'94	22'02	31'75	+9'73	147'95	127'92	—20'03	2'32	2'56	+0'24
Upper Burma	0'24	0'18	—0'06	6'12	8'20	+2'08	29'78	32'33	+2'55	1'56	2'78	+1'22
Bay Islands	1'17	0'26	—0'91	15'03	14'73	—0'30	69'08	52'32	—16'76	11'73	5'21	—6'52

TABLE XX.—Average actual and normal rainfall data of the 57 meteorological divisions in India for the four seasons of the year 1899 and for the whole year.

PROVINCE.	DIVISION.	JANUARY AND FEBRUARY.			MARCH TO MAY.			JUNE TO OCTOBER.			NOVEMBER AND DECEMBER.			WHOLE YEAR.			
		Average actual rainfall.	Average normal rainfall.	Variation of actual from normal.	Average actual rainfall.	Average normal rainfall.	Variation of actual from normal.	Average actual rainfall.	Average normal rainfall.	Variation of actual from normal.	Average actual rainfall.	Average normal rainfall.	Variation of actual from normal.	Average actual rainfall.	Average normal rainfall.	Variation of actual from normal.	
		Inches.	Inches.	Inches.	Inches.	Inches.	Inches.	Inches.	Inches.	Inches.	Inches.	Inches.	Inches.	Inches.	Inches.	Inches.	
BURMA . .	1. Tenasserim . .	0			34'13			160'68			3'27			198'08			
	2. Lower Burma . .	0'01			23'06			65'37			1'89			90'33			
	3. Central do. . .	0			8'92			40'54			0'91			50'37			
	4. Upper do. . .	0'27	0'24	+0'03	10'06	6'12	+3'94	37'12	29'78	+7'34	3'03	1'56	+1'47	50'48	37'70	+12'78	
	5. Arakan. . .	0			21'46			164'11			2'28			187'85			
BENGAL AND ASSAM.	6. Eastern Bengal . .	2'63	1'42	+1'21	22'08	17'24	+4'84	84'57	68'05	+16'52	0'32	1'58	-1'26	109'60	88'29	+21'31	
	7. Assam Surma . .	2'98	1'97	+1'01	35'12	37'77	-2'65	97'70	85'63	+12'07	0'56	1'24	-0'68	136'36	126'61	+9'75	
	8. Do. Hills . .	2'47	2'06	+0'41	35'04	25'29	+9'75	110'93	109'25	+1'68	1'37	1'53	-0'16	149'81	138'13	+11'68	
	9. Do. Brahmaputra . .	2'58	2'39	+0'19	25'58	23'77	+1'81	72'36	60'82	+11'54	1'23	0'93	+0'30	101'75	87'91	+13'84	
	10. Deltaic Bengal . .	1'48	1'64	-0'16	14'20	10'15	+4'05	57'54	47'67	+9'87	0	1'09	-1'09	73'22	60'55	+12'67	
	11. Central do. . .	2'11	1'30	+0'81	5'98	7'71	-1'73	54'61	46'60	+8'01	0	0'67	-0'67	62'70	56'28	+6'42	
	12. North do. . .	0'99	1'02	-0'03	13'11	15'57	-2'46	89'79	77'86	+11'93	0'14	0'25	-0'11	104'03	94'70	+9'33	
	13. Bengal Hills . .	2'97	1'68	+1'29	22'31	18'52	+3'79	113'30	117'39	-4'09	0'89	0'66	+0'23	139'47	138'25	+1'22	
	14. Orissa . .	0'46	1'18	-0'72	9'50	6'77	+2'73	44'42	51'31	-6'89	0'03	2'41	-2'38	54'41	61'67	-7'26	
	15. Chota Nagpur . .	0'98	1'41	-0'43	3'84	4'16	-0'32	40'32	47'36	-7'04	0	0'71	-0'71	45'14	53'64	-8'50	
	16. South Bihar . .	2'04	1'29	+0'75	2'16	2'37	-0'21	51'75	39'84	+11'91	0	0'39	-0'39	55'95	43'89	+12'06	
	17. North do. . .	1'35	1'21	+0'14	5'70	4'34	+1'36	64'03	46'69	+17'34	0	0'23	-0'23	71'08	52'47	+18'61	
	NORTH-WESTERN PROVINCES AND OUDH.	18. North-Western Provinces East.	1'22	0'99	+0'23	1'28	0'91	+0'37	43'47	36'02	+7'45	0	0'37	-0'37	45'97	38'29	+7'68
		19. South Oudh . .	1'02	0'95	+0'07	1'25	0'99	+0'26	37'20	33'74	+3'46	0	0'43	-0'43	39'47	36'11	+3'36
		20. North do. . .	1'15	1'09	+0'06	2'29	1'55	+0'74	39'64	35'89	+3'75	0	0'42	-0'42	43'08	38'95	+4'13
		21. North-Western Provinces Central.	0'36	0'78	-0'42	0'60	0'73	-0'13	32'57	32'41	+0'16	0	0'39	-0'39	33'33	34'31	-0'78
		22. North-Western Provinces West.	0'19	0'88	-0'69	1'05	1'04	+0'01	17'74	24'06	-6'32	0	0'35	-0'35	18'98	26'33	-7'35
23. North-Western Provinces East Submontane.		1'11	1'01	+0'10	3'10	1'75	+1'35	55'43	39'50	+15'93	0	0'27	-0'27	59'64	42'53	+17'11	
24. North-Western Provinces West Submontane.		1'17	2'49	-1'32	1'76	2'12	-0'36	29'48	41'07	-11'59	0	0'60	-0'60	32'41	46'28	-13'87	
PUNJAB . .	25. North-Western Provinces Hills.	2'82	4'63	-1'81	4'45	5'16	-0'71	43'82	50'67	-6'85	0	0'73	-0'73	51'09	61'19	-10'10	
	26. South-East Punjab . .	0'16	1'13	-0'97	0'45	1'32	-0'87	9'91	20'76	-10'85	0	0'33	-0'33	10'52	23'54	-13'02	
	27. South Punjab . .	0'05	1'08	-1'03	0'37	1'40	-1'03	5'33	13'21	-7'88	0'01	0'33	-0'32	5'76	16'02	-10'26	
	28. Central do. . .	0'34	2'00	-1'66	1'02	2'36	-1'34	6'30	14'00	-7'70	0'01	0'52	-0'51	7'67	18'88	-11'21	
	29. Punjab Submontane.	0'95	2'90	-1'95	1'27	2'69	-1'42	12'19	24'96	-12'77	0'01	0'75	-0'74	14'42	31'30	-16'88	
	30. Punjab Hills . .	3'63	6'38	-2'75	4'02	8'46	-4'44	30'04	45'12	-15'08	0'11	1'63	-1'52	37'80	61'59	-23'79	

TABLE XX.—Average actual and normal rainfall data of the 57 meteorological divisions in India for the four seasons of the year 1899 and for the whole year—concl'd.

PROVINCE.	DIVISION.	JANUARY AND FEBRUARY.			MARCH TO MAY.			JUNE TO OCTOBER.			NOVEMBER AND DECEMBER.			WHOLE YEAR.		
		Average actual rainfall.	Average normal rainfall.	Variation of actual from normal.	Average actual rainfall.	Average normal rainfall.	Variation of actual from normal.	Average actual rainfall.	Average normal rainfall.	Variation of actual from normal.	Average actual rainfall.	Average normal rainfall.	Variation of actual from normal.	Average actual rainfall.	Average normal rainfall.	Variation of actual from normal.
		Inches.	Inches.	Inches.	Inches.	Inches.	Inches.	Inches.	Inches.	Inches.	Inches.	Inches.	Inches.	Inches.	Inches.	Inches.
PUNJAB—concl'd.	31. North Punjab .	2'57	3'11	—0'54	3'57	4'55	—0'98	9'28	12'26	—2'98	0'16	1'23	—1'07	15'58	21'15	—5'57
	32. West Do. .	0'57	0'98	—0'41	0'35	1'40	—1'05	2'48	6'25	—3'77	0'01	0'27	—0'26	3'78	8'90	—5'12
BOMBAY AND MALABAR COAST DISTRICT (MADRAS.)	33. Malabar .	0'35	0'35	0	18'14	9'88	+8'26	82'78	113'58	—30'80	0'26	4'81	—4'55	101'53	128'62	—27'09
	33A. Travancore .	1'78			19'65			49'37			4'97			75'77		
	34. Madras South-Central.	0'11	0'25	—0'14	7'79	6'16	+1'63	14'54	17'93	—3'39	0'94	5'11	—4'17	23'38	29'45	—6'07
	35. Coorg .	0'46			10'11			59'92			0'11			70'60		
	36. Mysore .	0'03	0'16	—0'13	7'31	5'15	+2'16	20'87	25'88	—5'01	0'24	3'18	—2'94	28'45	34'37	—5'92
	37. Konkan .	0'01	0'12	—0'11	4'95	2'08	+2'87	53'09	111'62	—58'53	0'04	1'24	—1'20	58'09	115'06	—56'97
	38. Bombay Deccan .	0	0'10	—0'10	4'14	2'78	+1'36	16'74	31'76	—15'02	0	1'85	—1'85	20'88	36'49	—15'61
	39. Hyderabad North.	0	0'15	—0'15	3'26	1'58	+1'68	14'44	33'46	—19'02	0	2'00	—2'00	17'70	37'19	—19'49
	40. Khandesh .	0	0'13	—0'13	1'48	1'23	+0'25	11'94	29'93	—17'99	0	1'48	—1'48	13'42	32'77	—19'35
	41. Berar .	0'23	0'65	—0'42	1'83	1'25	+0'58	10'75	37'48	—26'73	0	1'18	—1'18	12'81	40'56	—27'75
CENTRAL PROVINCES AND BERAR.	42. Central Provinces West.	0'26	0'76	—0'50	1'21	0'93	+0'28	16'52	42'05	—25'53	0	0'88	—0'88	17'99	44'62	—26'63
	43. Central Provinces Central.	0'44	0'74	—0'30	1'00	1'27	—0'27	24'49	48'90	—24'41	0	0'67	—0'67	25'93	51'58	—25'65
	44. Central Provinces East.	0'31	0'80	—0'49	2'45	1'94	+0'51	33'55	46'55	—13'00	0	0'74	—0'74	36'31	50'03	—13'72
	45. Gujarat .	0	0'08	—0'08	0'27	0'32	—0'05	11'85	43'39	—31'54	0'02	0'24	—0'22	12'14	44'03	—31'89
BOMBAY (NORTH)	46. Kathiawar and Cutch.	0	0'14	—0'14	0'36	0'37	—0'01	5'40	26'20	—20'80	0'03	0'36	—0'33	5'79	27'07	—21'28
	47. Sind .	0'01	0'71	—0'70	0'70	0'60	+0'10	0'04	4'51	—4'47	0'02	0'18	—0'16	0'77	6'00	—5'23
	48. Baluchistan Hills .	1'67	3'66	—1'99	1'99	1'68	+0'31	0'45	2'48	—2'03	0'47	1'62	—1'15	4'58	9'44	—4'86
RAJPUTANA AND CENTRAL INDIA.	49. Central India East	0'19	0'98	—0'79	0'42	0'76	—0'34	26'38	40'95	—14'57	0'04	0'72	—0'68	27'03	43'41	—16'38
	50. Rajputana East, Central India West.	0'02	0'69	—0'67	0'60	0'81	—0'21	14'09	26'19	—12'10	0'03	0'49	—0'46	14'74	28'18	—13'44
	51. West Rajputana .	0	0'43	—0'43	0'24	0'72	—0'48	2'15	11'15	—9'00	0'08	0'25	—0'17	2'47	12'55	—10'08
MADRAS .	52. East Coast North .	0'07	0'42	—0'35	5'78	3'38	+2'40	25'14	32'39	—7'25	0'04	4'25	—4'21	31'03	40'44	—9'41
	52A. Do. do. do.(a)	0	0'26	—0'26	6'22	4'88	+1'34	36'46	51'93	—15'47	0	3'14	—3'14	42'68	60'21	—17'53
	53. Hyderabad South .	0	0'26	—0'26	2'19	2'25	—0'06	13'98	25'52	—11'54	0	1'43	—1'43	16'17	29'46	—13'29
	54. Madras Central .	0	0'08	—0'08	3'64	2'50	+1'14	13'94	21'12	—7'18	0'31	2'88	—2'57	17'89	26'58	—8'69
	55. East Coast Central	0'02	0'67	—0'65	3'66	2'05	+1'61	20'86	20'53	+0'33	1'05	11'94	—10'89	25'59	35'19	—9'60
	56. East Coast South .	0'36	0'77	—0'41	7'29	4'21	+3'08	25'76	23'73	+2'03	4'12	13'79	—9'67	37'53	42'50	—4'97
	57. Madras South	1'69	1'18	+0'51	8'61	5'13	+3'48	11'69	12'13	—0'44	3'86	10'14	—6'28	25'85	28'58	—2'73

TABLE XXI.—Average actual and normal number of rainy days of the 57 meteorological divisions of India for the four seasons of the year 1899 and for the whole year.

PROVINCE.	DIVISION.	JANUARY AND FEBRUARY.			MARCH TO MAY.			JUNE TO OCTOBER.			NOVEMBER AND DECEMBER.			WHOLE YEAR.			
		Average actual number of rainy days.	Average normal number of rainy days.	Variation of actual from normal.	Average actual number of rainy days.	Average normal number of rainy days.	Variation of actual from normal.	Average actual number of rainy days.	Average normal number of rainy days.	Variation of actual from normal.	Average actual number of rainy days.	Average normal number of rainy days.	Variation of actual from normal.	Average actual number of rainy days.	Average normal number of rainy days.	Variation of actual from normal.	
BURMA	1. Tenasserim . .	0'1			30'7			114'8			5'4			151'0			
	2. Lower Burma . .	0			23'1			98'4			3'5			125'0			
	13. Central do. . .	0			16'1			73'8			2'0			91'9			
	4. Upper do. . .	0'8			12'6			50'4			4'6			68'4			
	5. Arakan . . .	0			20'7			112'3			3'9			136'9			
BENGAL AND ASSAM.	6. Eastern Bengal . .	5'1	2'5	+2'6	22'6	19'4	+3'2	80'3	71'3	+9'0	0'3	2'0	-1'7	108'3	95'2	+13'1	
	7. Assam Surma . .	6'0	4'2	+1'8	38'5	37'5	+1'0	91'5	83'3	+8'2	1'2	2'0	-0'8	137'2	127'0	+10'2	
	8. Do. Hills . . .	7'3	4'6	+2'7	32'8	31'5	+1'3	95'0	90'5	+4'5	2'4	2'7	-0'3	137'5	129'3	+8'2	
	9. Do. Brahmaputra . .	7'2	6'6	+0'6	33'7	34'7	-1'0	77'8	68'5	+9'3	3'0	2'2	+0'8	121'7	112'0	+9'7	
	10. Deltaic Bengal . .	3'4	2'6	+0'8	17'2	13'9	+3'3	62'0	62'4	-0'4	0	1'4	-1'4	82'6	80'3	+2'3	
	11. Central do. . .	4'6	2'4	+2'2	9'6	11'0	-1'4	59'7	58'9	+0'8	0	1'0	-1'0	73'9	73'3	+0'6	
	12. North do. . .	2'4	2'1	+0'3	16'6	17'7	-1'1	76'4	64'8	+11'6	0'3	0'5	-0'2	95'7	85'1	+10'6	
	13. Bengal Hills . .	6'2	4'0	+2'2	31'3	24'7	+6'6	96'9	90'7	+6'2	2'9	1'7	+1'2	137'3	121'1	+16'2	
	14. Orissa . . .	1'3	2'0	-0'7	13'6	9'1	+4'5	52'2	58'9	-6'7	0	2'6	-2'6	67'1	72'6	-5'5	
	15. Chota Nagpur . .	2'3	2'8	-0'5	7'4	6'8	+0'6	49'4	59'5	-10'1	0	1'1	-1'1	59'1	70'2	-11'1	
	16. South Bihar . .	3'5	2'5	+1'0	4'3	3'6	+0'7	50'1	46'8	+3'3	0	0'6	-0'6	57'9	53'5	+4'4	
	17. North do. . .	3'6	2'4	+1'2	7'5	6'4	+1'1	58'6	49'4	+9'2	0	0'6	-0'6	69'7	58'8	+10'9	
	NORTH-WESTERN PROVINCES AND OUDH.	18. North-Western Provinces East. . .	2'5	2'2	+0'3	2'3	2'1	+0'2	42'9	40'9	+2'0	0	0'6	-0'6	47'7	45'8	+1'9
		19. South Oudh . . .	2'5	2'0	+0'5	1'9	2'2	-0'3	38'8	37'8	+1'0	0	0'7	-0'7	43'2	42'7	+0'5
		20. North do. . .	3'2	2'1	+1'1	4'1	3'1	+1'0	42'7	38'1	+4'6	0	0'7	-0'7	50'0	44'0	+6'0
		21. North Western Provinces Central. . .	1'2	1'9	-0'7	1'5	1'9	-0'4	33'3	36'1	-2'8	0	0'6	-0'6	36'0	40'5	-4'5
		22. North-Western Provinces West. . .	0'7	2'2	-1'5	2'5	2'7	-0'2	23'1	27'5	-4'4	0	0'5	-0'5	26'3	32'9	-6'6
23. North-Western Provinces East Submontane. . .		3'0	2'2	+0'8	5'4	3'1	+2'3	49'8	41'6	+8'2	0	0'6	-0'6	58'2	47'5	+10'7	
24. North-Western Provinces West Submontane. . .		2'1	4'5	-2'4	4'7	4'4	+0'3	33'4	37'3	-3'9	0	1'1	-1'1	40'2	47'3	-7'1	
25. North-Western Provinces Hills. . .		5'7	8'1	-2'4	9'3	11'1	-1'8	48'5	58'0	-9'5	0	1'7	-1'7	63'5	78'9	-15'4	
26. South-East Punjab . .		0'4	2'5	-2'1	1'6	3'0	-1'4	16'0	22'7	-6'7	0	0'8	-0'8	18'0	29'0	-11'0	
27. South do. . .		0'2	2'4	-2'2	1'3	2'9	-1'6	9'2	15'5	-6'3	0	0'6	-0'6	10'7	21'4	-10'7	
PUNJAB	28. Central do. . .	1'2	4'1	-2'9	2'9	4'8	-1'9	10'0	15'9	-5'9	0	0'8	-0'8	14'1	25'6	-11'5	
	29. Punjab Submontane . .	1'7	5'0	-3'3	3'8	4'9	-1'1	18'2	24'4	-6'2	0	1'1	-1'1	23'7	35'4	-11'7	
	30. Do. Hills . . .	6'5	8'7	-2'2	11'6	13'3	-1'7	35'3	45'6	-10'3	0'4	2'2	-1'8	53'8	69'8	-16'0	

TABLE XXI.—Average actual and normal number of rainy days of the 57 meteorological divisions of India for the four seasons of the year 1899 and for the whole year—concl'd.

PROVINCE.	DIVISION.	JANUARY AND FEBRUARY.			MARCH TO MAY.			JUNE TO OCTOBER.			NOVEMBER AND DECEMBER.			WHOLE YEAR.		
		Average actual number of rainy days.	Average normal number of rainy days.	Variation of actual from normal.	Average actual number of rainy days.	Average normal number of rainy days.	Variation of actual from normal.	Average actual number of rainy days.	Average normal number of rainy days.	Variation of actual from normal.	Average actual number of rainy days.	Average normal number of rainy days.	Variation of actual from normal.	Average actual number of rainy days.	Average normal number of rainy days.	Variation of actual from normal.
PUNJAB—concl'd.	31. North Punjab .	5.5	5.4	+0.1	8.1	7.8	+0.3	14.8	15.4	-0.6	0.6	1.6	-1.0	29.0	30.2	-1.2
	32. West do. .	1.6	2.4	-0.8	1.1	2.9	-1.8	4.5	8.6	-4.1	0	0.4	-0.4	7.2	14.3	-7.1
	33. Malabar .	0.3	0.5	-0.2	21.3	12.4	+8.9	72.0	100.6	-28.6	0.6	7.0	-6.4	94.2	120.5	-26.3
	33A. Travancore .	2.1			25.2			57.5			5.5			90.3		
BOMBAY AND MALABAR COAST DISTRICTS (MADRAS).	34. Madras South-Central.	0.2	0.5	-0.3	11.6	9.1	+2.5	22.3	27.8	-5.5	2.1	8.5	-6.4	36.2	45.9	-9.7
	35. Coorg .	1.0			19.0			74.1			0.4			94.5		
	36. Mysore .	0.1	0.3	-0.2	11.4	8.7	+2.7	32.7	38.9	-6.2	0.7	4.9	-4.2	44.9	52.8	-7.9
	37. Konkan .	0	0.2	-0.2	6.0	3.2	+2.8	65.6	93.7	-28.1	0.1	2.0	-1.9	71.7	99.1	-27.4
	38. Bombay Deccan .	0	0.3	-0.3	6.6	5.6	+1.0	20.3	45.9	-16.6	0	3.1	-3.1	35.9	54.9	-19.0
	39. Hyderabad North .	0			7.3			24.6			0			31.9		
	40. Khandesh .	0	0.2	-0.2	3.2	2.1	+1.1	21.3	42.1	-20.8	0	2.2	-2.2	24.5	46.6	-22.1
	41. Berar .	0.8			5.0			19.8			0			25.6		
CENTRAL PROVINCES AND BERAR.	42. Central Provinces West.	0.9	1.4	-0.5	3.3	2.3	+1.0	25.4	49.2	-23.8	0	1.1	-1.1	29.6	54.0	-24.4
	43. Central Provinces Central.	1.1	1.6	-0.5	3.2	2.8	+0.4	31.5	52.4	-20.9	0	1.1	-1.1	35.8	57.9	-22.1
	44. Central Provinces East.	0.6	1.6	-1.0	6.1	3.7	+2.4	40.1	49.5	-9.4	0	1.1	-1.1	46.8	55.9	-9.1
	45. Gujarat .	0	0.2	-0.2	0.7	0.5	+0.2	16.6	47.7	-31.1	0.1	0.5	-0.4	17.4	48.9	-31.5
BOMBAY (NORTH)	46. Kathiawar and Cutch.	0	0.2	-0.2	0.8	0.6	+0.2	8.2	27.3	-19.1	0.1	0.2	-0.1	9.1	28.3	-19.2
	47. Sind .	0			1.6			0.1			0.2			1.9		
	48. Baluchistan Hills .	4.3			4.6			1.0			2.0			11.9		
RAJPUTANA AND CENTRAL INDIA.	49. Central India, East	0.7			1.3			26.0			0.1			28.1		
	50. Rajputana East, and Central India West.	0.1			1.8			16.6			0.1			18.6		
	51. West Rajputana .	0			0.6			4.1			0.2			4.9		
MADRAS .	52. Madras East Coast North.	0.2	0.7	-0.5	8.1	5.3	+2.8	35.5	43.3	-7.8	0	4.3	-4.3	43.8	53.6	-9.8
	52A. Do. do. (a)	0	0.7	-0.7	11.0	9.7	+1.3	55.0	67.6	-12.6	0	5.3	-5.3	66.0	83.3	-17.3
	53. Hyderabad South .	0			6.0			24.4			0			30.4		
	54. Madras Central .	0	0.2	-0.2	7.1	4.2	+2.9	21.9	30.7	-8.8	0.6	4.3	-3.7	29.6	39.4	-9.8
	55. Madras East Coast Central.	0	0.8	-0.8	4.7	2.5	+2.2	23.8	27.1	-3.3	1.6	10.5	-8.9	30.1	40.9	-10.8
	56. Do. South .	0.9	1.0	-0.1	9.4	4.8	+4.6	27.6	32.2	-4.6	5.6	14.0	-8.4	43.5	52.0	-8.5
	57. Madras South .	1.2	1.8	-0.6	11.4	7.5	+3.9	16.4	18.8	-2.4	6.9	13.1	-6.2	35.9	41.2	-5.3

I.—The cold weather period.—January was unusually free from cold weather storms in Northern India. The leading features of the month over nearly the whole of India were abnormal dryness of the air, small amount of cloud and scanty rainfall. In Northern and Central India, the Central Provinces, Berar and the North Deccan temperature was on the mean of the month considerably lower than usual, the deficiency being slightly more marked in the night than the day temperature. The abnormal features of the meteorology of the month were very similar to those of January 1898, and were chiefly due to the comparative absence of cold weather storms during the month in the Persian area and Northern India and to a steady persistent excess of pressure in the Persian area and a strong outflow of cold dry air from that area to the Indian region.

As already mentioned, January was unusually dry and free from cold weather disturbances, and hence the rainfall was generally very scanty and more or less below the normal.

Two depressions, which originated in the Central Provinces and Berar during the first week of January and advanced rapidly eastwards, gave light to moderate rain in the Gangetic Plain, Bengal and Orissa and moderate showers in the Punjab and Kashmir hills. A disturbance in North-Eastern India, resembling those of the hot weather months and hence not of the cold weather type, gave numerous thundershowers in that area on the 26th, 27th and 28th. Light occasional showers were also received in South Madras. Over a large part of the country, including the Upper Sub-Himalayas, Indus Valley and Rajputana, Central India and Gujarat and the Deccan, the rainfall was practically or actually *nil*. It was small in amount and in moderate to considerable defect in South India, practically normal in the West Coast, Burma Inland and Assam, and in marked excess in Bengal, Orissa and the Gangetic Plain.

There were in all six disturbances or cold weather storms during the month of February—a larger number than usual. They were, however, very feeble and gave much less rain, both in amount and extent, than occasionally accompanies these storms. The periods of disturbance and hence of partial or general rainfall were the 2nd and 3rd, the 5th to the 7th, the 9th to the 13th, the 14th to the 16th and the 25th to the 28th.

The first disturbance gave rain only to Baluchistan and the Punjab, the second and third to Northern India generally, the fourth to Baluchistan, the Punjab and Assam and the sixth to Bengal and Assam only.

The rainfall of the month was small in amount in the areas of rainfall, and was more or less in defect. It was locally in excess in the Indus Valley and North-West Rajputana and the West Coast.

The following data show that the precipitation of the

cold weather period was largely below the normal at most of the hill stations in Upper India :—

STATION.	RAINFALL.					
	Actual, January	Actual, February	Total actual of period, January and February	Total normal of period, January and February	Variation from normal.	Percentage variation from normal.
	Inches.	Inches.	Inches.	Inches.	Inches.	Inches.
Murree . . .	0'16	3'02	3'18	7'25	—4'07	—56
Simla . . .	0'76	2'23	2'99	5'03	—2'04	—41
Dalhousie . . .	2'18	3'95	6'13	5'80	+0'33	+6
Dharmasala . . .	1'59	4'68	6'27	8'95	—2'68	—30
Mussoorie . . .	2'11	2'66	4'77	5'72	—0'95	—17
Ranikhet . . .	1'32	1'07	3'29	4'89	—1'60	—33
Kailang . . .	0'42	3'17	3'59	6'27	—2'68	—43

Accurate snowfall measurements are now made at several stations in the Punjab Himalayas. The following gives the amounts registered at four of these stations, where the measurements are believed to be carefully taken :—

DISTRICT OR STATE.	STATION.	Height, in feet, above sea-level.	TOTAL SNOWFALL IN THE MONTH OF		Total.	Approximate normal snowfall of period.
			January	February		
PUNJAB .	Murree . .	6,344	ft. in. 0 3	ft. in. 6 4	ft. in. 6 7	ft. in. 11 9
	Kilar . .	8,000	0 2	5 6	5 8	
CHAMBA .	Thandla . .	7,000	?	0 9		
	Kalatop . .	8,000	2 0	3 0	5 0	

The rainfall of the period was largely in defect, relatively to the normal, over the whole of North-Western and Central India and in Baluchistan, as shown below :—

AREA.	RAINFALL OF PERIOD, JANUARY AND FEBRUARY.			
	Average actual,	Average normal.	Variation from normal.	Percentage variation from normal.
	Inches.	Inches.	Inches.	
Baluchistan	1'67	3'66	—1'99	—54
Punjab	0'77	1'87	—1'10	—59
North-Western Provinces and Oudh.	0'89	1'17	—0'28	—24
Rajputana	0'01	0'56	—0'55	—98
Sind	0'01	0'71	—0'70	—99
Central India	0'19	0'98	—0'79	—81

The deficiency was very pronounced in Upper India in both months, but more largely in January than in February.

North-Eastern India, with the exception of Chota Nagpur and Orissa, received more than the normal amount of rain, due chiefly to the passage of two depressions in January into that area from the Central Provinces, and in part to a series of hot weather thunderstorms in East Bengal and Assam in February. The rainfall of the period was, on the other hand, in defect in Burma, Orissa and Chota Nagpur. The following gives data :—

AREA.	RAINFALL OF PERIOD, JANUARY AND FEBRUARY.			
	Average actual.	Average normal.	Variation from normal.	Percentage variation from normal.
	Inches.	Inches.	Inch.	
Bihar	1'70	1'25	+0'45	+36
Chota Nagpur	0'98	1'41	—0'43	—30
Bengal	1'80	1'35	+0'45	+33
Orissa	0'46	1'18	—0'72	—61
Assam	2'78	2'18	+0'60	+28
Burma	0'06	0'21	—0'15	—71

The rainfall of the period was very scanty in the Peninsula, except in South Madras, which received moderate rain from thunderstorms in February and Malabar which obtained its normal amount.

The following gives comparative data for that area :—

AREA.	RAINFALL OF PERIOD, JANUARY AND FEBRUARY.			
	Average actual.	Average normal.	Variation from normal.	Percentage variation from normal.
	Inches.	Inches.	Inch.	
Central Provinces	0'34	0'77	—0'43	—56
Berar	0'23	0'65	—0'42	—65
Hyderabad	0	0'21	—0'21	—100
Bombay Deccan	0	0'10	—0'10	—100
Madras Central	0	0'08	—0'08	—100
Madras Coast	0'15	0'62	—0'47	—76
Malabar	0'35	0'35	0	0
Konkan	0'01	0'12	—0'11	—92
Mysore	0'03	0'16	—0'13	—81
Madras, South	1'69	1'18	+0'51	+43

II.—The hot weather period.—The rainfall of March was largely in defect over nearly the whole of India.

A number of depressions, originating either in the Persian area, Baluchistan or Sind, crossed Northern India during the first three weeks of the month. They gave little cloud and no rain over the greater part of the districts they traversed. Baluchistan, Kashmir, the Punjab hills and the North Punjab received moderate showers during the advance of these depressions across North-Western India, and hence obtained almost daily rain from the 3rd to the 17th. North and East Bengal and Assam had moderate rain during the later stages of two of these storms, chiefly from the 3rd to the 11th and on the 14th, 15th and 18th. A strong influx of local sea winds across the Bengal Coast in the last week of the month gave a moderate burst of rain accompanying thunderstorms in Assam and North and East Bengal from the 27th to the 31st. This rainfall was heaviest in the Cachar and Sylhet districts and the Khasi and Jaintia hills.

Over by far the greater part of India the rainfall was absolutely or practically nil.

April was more disturbed than usual over the whole of India. A succession of five depressions formed in Sind and passed eastwards across Upper India. Each depression during its advance gave series of duststorms in the plains and thunderstorms in the lower ranges and snow storms in the higher ranges of the Kashmir and Punjab Himalayas.

The most abnormal feature of the month was an unusually prolonged and excessive burst of rain (accompanying thunderstorms) between the 10th and 24th in the Peninsula and North-Eastern India. The rainfall of the month was hence in excess over the greater part of India, and the excess was abnormally large in the southern half of the Peninsula.

No rain fell during the month in Sind, Rajputana West, Central India, North Bombay, the West Punjab and Baluchistan. The North and Submontane Punjab and the hill districts to the north and east of the Punjab received frequent light to moderate rain or snow showers during the passage of each of the series of five depressions which advanced across North-Western India during the month. Afghanistan, Chitral, Kashmir and the Punjab hills obtained moderately heavy rain or snow from the 16th to the 18th during the advance of the fourth of these depressions. North-Eastern India and Burma obtained moderate to heavy daily showers from the 9th to the 15th and again from the 19th to the 24th. The rainfall of the month was in considerable to large excess in Lower Burma, Bengal and the Gangetic Plain. The rainfall of the month was slightly below the normal in Assam and Burma Inland. Rain fell daily in the Peninsula during the period from the 9th to the 24th. It was restricted to the southern half of the Peninsula from the 9th to the 15th, and occasionally extended north during the remainder of the period over the Deccan into Berar and the Central Provinces. The rainfall of the month in

the Peninsula was abnormal in its amount, and it was almost unique in character during the past 25 years. The average actual rainfall of the month in Southern India and the West Coast was nearly four times the normal and in the Deccan nearly three times the normal. The rainfall was most excessive in the southern districts of Madras including Madura, Trichinopoly, Tanjore, Kistna, Chingleput, Tinnevely, Arcot and Malabar.

The rainfall of the month of May was generally more or less below the normal over the Peninsula and the central parts of the country, and above it over the greater part of Burma and of Northern India. The advances of the monsoon currents on the Malabar Coast were uncertain and interrupted, so that Malabar and South Madras received somewhat less rain than usual during the month. On the other hand, Burma received heavy rain both from the cyclonic storm in the first week of the month and from an advance of monsoon winds in the last week, so that it generally reported excessive rain. The excess was large in Deltaic Burma (66%) and Upper Burma (61%). Assam and Bengal received moderate to heavy rain which was, however, irregularly distributed, so that while some divisions received excessive rainfall others exhibited a marked deficiency. Over Northern and Central India the rain mainly fell during a disturbed period which lasted from about the 11th to the 23rd. During this period a well-defined trough of low pressure extended from North-Western India towards the Bay Coast. The moist south-easterly winds on the north side of this trough were accompanied with frequent thunderstorms and rain, and the total fall of rain in the North-Western Provinces was in excess of the normal. In the Central Provinces and Central India the rainfall of the month occurred during the same disturbed period, but the rainfall there was light and generally below the average. Madras also had less rain than usual, while, on the contrary, North Bombay and Baluchistan received more than the small usual amount.

The following is a summary of the chief features of the distribution of rainfall throughout the whole period of the hot weather in 1899.

(1) The rainfall was more or less in defect over the whole area including the Punjab, Rajputana, Central India, Kathiawar and Gujarat (with a few local exceptions of no importance), and was very slightly above the normal in Sind.

The following gives data in illustration :—

AREA.	VARIATION OF RAINFALL FROM NORMAL.				
	March.	April.	May.	Total of period March to May.	Percentage variation from normal.
	Inch.	Inch.	Inch.	Inches.	
Punjab . . .	—0'49	—0'25	—0'37	—1'11	—48
Rajputana . . .	—0'19	+0'05	—0'20	—0'34	—44
Central India . . .	—0'26	—0'06	—0'02	—0'34	—45
Sind . . .	+0'11	—0'20	+0'19	+0'10	+17
Kathiawar . . .	—0'05	—0'08	+0'12	—0'01	—3
Gujarat . . .	—0'01	—0'01	—0'03	—0'05	—16

(2) The rainfall of the period was in excess over nearly the whole of the Gangetic Plain, Bengal and Assam in April and May, and was in general but slight defect in these areas, except North Bengal, Sikkim and the Assam Valley in March. It was in excess throughout the whole period only in the Bengal Hills. The following gives data :—

DIVISION.	VARIATION OF RAINFALL FROM NORMAL.				
	March	April	May.	Total of period March to May.	Percentage variation from normal.
	Inches.	Inches.	Inches.	Inches.	
North-Western Provinces—West Submontane.	—0'81	+0'15	+0'30	—0'36	—17
North-Western Provinces—East Submontane.	—0'29	+0'81	+0'83	+1'35	+77
North-Western Provinces—West.	—0'41	+0'12	+0'30	+0'01	+1
North-Western Provinces—Central.	—0'28	+0'17	—0'02	—0'13	—18
North Oudh . . .	—0'43	+0'33	+0'84	+0'74	+48
South Oudh . . .	—0'30	+0'26	+0'30	+0'26	+26
North-Western Provinces—East.	—0'26	+0'29	+0'24	+0'27	+41
North Bihar . . .	—0'35	+1'41	+0'30	+1'36	+31
South Bihar . . .	—0'44	+0'66	—0'43	—0'21	—9
Chota Nagpur . . .	—0'98	+1'10	—0'44	—0'32	—8
Orissa . . .	—1'8	+2'54	+1'27	+2'73	+40
Bengal Hills . . .	+0'37	+0'64	+2'78	+3'79	+20
North Bengal . . .	+0'40	—0'24	—2'02	—1'86	—16
Central Bengal . . .	—0'89	+0'10	—0'94	—1'73	—22
Deltaic Bengal . . .	—1'30	+1'58	+3'77	+4'05	+40
Eastern Bengal . . .	—1'50	+2'72	+3'62	+4'84	+28
Assam Brahmaputra . . .	+0'66	—0'13	+1'28	+1'81	+8
Assam Surma . . .	—1'50	+0'78	—1'87	—2'65	—7

(3) The precipitation was slightly less than usual in Burma and Tenasserim in March and April, but was in large excess in May, and was hence in large excess for the

period, except in Arakan, where it was normal, as shown below :—

DIVISION.	VARIATION OF RAINFALL FROM NORMAL.				
	March	April	May	Total of period March to May.	Percentage variation from normal.
	Inch.	Inch.	Inches.	Inches.	
Tenasserim . . .	-0'24	-0'74	+7'34	+6'36	+28
Lower Burma . . .	-0'09	-0'14	+9'46	+9'23	+73
Central Burma . . .	-0'03	+0'02	+1'76	+1'75	+24
Upper Burma . . .	-0'55	-0'77	+3'38	+2'06	+25
Arakan . . .	-0'32	-0'28	+0'35	-0'25	-1

The rainfall in May was especially heavy at the stations for which data are given below :—

STATION.	RAINFALL.		
	Actual, May.	Normal, May.	Variation from normal.
Ba-sein	31'38	8'49	+22'89
Tavoy	33'21	18'49	+14'72
Rangoon	23'19	10'79	+12'40
Magwe	11'27	5'16	+6'11
Minbu	11'88	4'25	+7'63
Kindat	17'91	5'72	+12'19
Mingin	7'92	3'92	+4'00
Bhamo	12'04	6'02	+6'02
Sandoway	32'65	13'16	+19'49
Kyaukpyu	26'09	10'64	+15'45

(4) The rainfall of the period was generally in slight to moderate excess over nearly the whole of the Peninsula, due to the abnormal rainfall of the month of April. The rainfall was generally below the small normal of the month in March, and also generally below it in May, (more especially in the Malabar district which usually receives moderately heavy rain in the last fortnight of the month) :—

DIVISION.	VARIATION FROM NORMAL OF RAINFALL.				
	March.	April.	May.	Total of period March to May.	Percentage variation from normal.
	Inch.	Inches.	Inches.	Inches.	
Berar	-0'46	+1'03	+0'01	+0'58	+46
Central Provinces . . .	-0'38	+0'55	+0'01	+0'18	+13
Malabar	-0'25	+10'08	-1'57	+8'26	+84
Konkan	+0'03	+3'09	-0'25	+2'87	+138
Khandesh	-0'03	+0'39	-0'11	+0'25	+20

DIVISION.	VARIATION FROM NORMAL OF RAINFALL.				
	March.	April.	May.	Total of period March to May.	Percentage variation from normal.
	Inch.	Inches.	Inches.	Inches.	
Bombay Deccan . . .	+0'10	+1'53	-0'27	+1'36	+49
Hyderabad	-0'23	+1'06	-0'02	+0'81	+42
Madras (Central) . . .	-0'09	+1'66	-0'43	+1'14	+46
„ East-Coast (V. rth) . .	-0'44	+2'85	-0'01	+2'40	+71
„ „ (Central)	-0'20	+2'84	-1'03	+1'61	+79
„ „ (South)	-0'35	+4'37	-0'94	+3'08	+73
„ (South)	-0'78	+5'59	-1'33	+3'48	+68
Mysore	-0'25	+2'77	-0'36	+2'16	+42

III.—South-west monsoon period.—The following gives the dates of the establishment of the monsoon (*i.e.*, of the commencement of the heavy rainfall which marked the first burst of the monsoon) in different parts of India in 1899 :—

PROVINCE OR DIVISION.	Date of commencement of the monsoon rains in 1899.
Malabar	5th June.
Konkan	11th „
Kathiawar	16th „
Central Provinces . . .	12th „
Central India	13th „
Rajputana	20th „
Bengal	13th „
Chota Nagpur	14th „
Bihar	14th „
North-Western Provinces . .	14th „
Punjab	21st „

As the rains were a partial to complete failure over the greater part of the area usually dependent upon the Bombay current in July, August and September, it is not possible to give fixed dates for the retreat of the south-west monsoon current from that area.

The following gives the approximate dates of the termination of the rains in Northern India :—

PROVINCE OR DIVISION.	Date of termination of the monsoon rains in 1899.
East Punjab	14th September.
North-Western Provinces . .	16th „
Bihar	25th „
Bengal	25th „
Burma	9th November.

The following is a brief statement of the chief features of the rainfall in India, month by month, during the south-west monsoon period of 1899:—

June.—The chief features connected with the rainfall of the month were the slight delay in the general advance of the monsoon along the West Coast, the diminution in the amount of rain given by the Arabian sea current after the 24th, and finally the steady rainfall in Burma throughout the month and in Bengal, the Gangetic Plain and the Punjab after the middle of the month. A feeble advance of monsoon winds occurred over the south of the Arabian Sea on the 4th and 5th, and moderate or light rain fell along the West Coast and to a certain extent in the Deccan between the 6th and the 9th, when a change occurred and a heavy burst of rain was received along the West Coast. Heavy rain extended as far north as Bombay on the 12th, and rain spread inland over the Peninsula and the Central Provinces. Rain continued to fall heavily along the West Coast from the 12th to the 22nd. Heavy rain ceased on the 22nd in Malabar and over the remainder of the West Coast on the 24th, after which date light showers only were received in Western India. Over the central parts of the country, including Rajputana, Central India, Berar, the Central Provinces and the Deccan, the rainfall was intermittent. There were some showers on the 9th, from the 12th to the 15th, and again from the 18th to the 21st. On the 22nd dry westerly winds set in and, except for some showers on the 25th and 26th, rain did not recommence over this region during the remainder of the month.

In North-Eastern and Northern India rainfall conditions were much more favourable. Southerly winds from the Bay gave good general rain to Burma throughout the whole month. These winds extended into Assam and East and North Bengal on several occasions during the first ten days of the month, giving more or less heavy thunder-showers to those areas. On the 11th rain was reported from Orissa and Deltaic Bengal and on the 13th monsoon rains set in over most parts of Bengal and spread quickly north-westward up the Gangetic Plain. During the week from the 15th to the 20th rain from the Bay current was unsteady (except in Burma) and limited to Burma, North-Eastern India and the east of the North-Western Provinces, but on the 21st the current again advanced to its furthest limits in the Punjab and from the 22nd to the end of the month the whole of Burma and Northern India, including the east of Rajputana and of the Punjab, received favourable rain. A remarkable feature of the monsoon rains was that they were not introduced, as is usually the case, by a cyclonic storm.

The rainfall of the month was generally in defect over Burma, the Central Provinces and the Peninsula, the deficiency being greatest and large in Madras, moderate in the Central Provinces, and slight along the Konkan

Coast. On the other hand, the rainfall of the month was generally in excess over Assam, Bengal, the North-Western Provinces, the Punjab, Central India and the east of Rajputana, the excess being large in the Gangetic Plain and in parts of the Punjab, Central India and East Rajputana.

The rainfall of the month was in moderate to considerable defect in Burma and the Bengal and Assam Hills, as shown by the following statement:—

AREA.	RAINFALL.			
	Average actual, June.	Average normal, June.	Variation from normal.	Percentage variation from normal.
	Inches.	Inches.	Inches.	
Tenasserim . . .	29'35	39'94	−10'59	−27
Burma Lower . . .	17'52	19'18	−1'66	−9
„ Central . . .	9'14	12'13	−2'99	−25
„ Upper . . .	6'40	10'17	−3'77	−37
Arakan . . .	40'70	53'00	−12'30	−23
Assam Hills . . .	30'52	32'53	−2'25	−7
Bengal „ . . .	24'56	27'22	−2'36	−9

It was in general excess over Assam, Bengal, Bihar, Chota Nagpur, the North-Western Provinces, the Punjab, Central India and East Rajputana, Gujarat, Kathiawar, Khandesh and Malabar. The following gives comparative data in illustration:—

AREA.	RAINFALL.			
	Average actual, June.	Average normal, June.	Variation from normal.	Percentage variation from normal.
	Inches.	Inches.	Inches.	
Assam	25'47	19'56	+5'91	+30
Bengal	17'00	14'72	+2'34	+16
Bihar	10'89	7'42	+3'47	+47
Chota Nagpur . . .	11'80	8'24	+3'56	+43
North-Western Provinces and Oudh	9'91	4'32	+5'59	+129
Punjab	2'76	1'69	+1'07	+63
Central India East .	13'91	6'52	+7'39	+113
Rajputana East and Central India West	7'40	3'27	+4'13	+126
Gujarat	8'77	6'26	+2'51	+40
Kathiawar	3'67	3'26	+0'41	+13
Khandesh	5'81	5'69	+0'12	+2
Malabar	38'80	36'40	+2'40	+7

It was normal or in defect over the remainder of India. The variations were small, except in the divisions for which comparative data are given below :—

DIVISION.	RAINFALL.			
	Average actual, June.	Average normal, June.	Variation from normal.	Percentage variation from normal.
	Inches.	Inches.	Inches.	
Berar.	4'33	7'17	—2'84	—40
Central Provinces (West) . .	4'74	7'49	—2'75	—37
„ „ (Central) . .	5'27	8'22	—2'95	—36
„ „ (East) . .	7'04	8'31	—1'27	—15
Madras East Coast (North) . .	3'22	4'92	—1'70	—35
„ Central . .	0'67	2'62	—1'95	—74
„ East Coast (Central) . .	0'73	1'65	—0'92	—56
„ South (Central) . .	0'58	2'02	—1'44	—71

The only areas in which the rains were at this stage of the monsoon conspicuously deficient, were Berar, the Central Provinces and portions of Madras.

July.—On the 4th a depression developed over South and South-West Bengal and the head of the Bay, and on the 5th the rainfall almost ceased over the North-Western Provinces and West Bengal, though it continued over Burma and Bengal proper.

On the 6th there occurred a marked extension, the rainfall spreading north-westward through the North-Western Provinces into the Punjab. The rainfall conditions on this day were very remarkable as, while Burma, Bengal, Assam, the east of the Central Provinces and of Central India, the North-Western Provinces, the east of Rajputana and the greater part of the Punjab had general and in places fairly heavy, rain, the whole of North Bombay, the south and west of Rajputana, Berar, the west of the Central Provinces and the Peninsula were actually or practically rainless. On that day a shallow depression was developing at the head of the Bay, a depression which subsequently exercised a considerable influence on the rainfall. On the next day, the 7th, it was shown as a shallow depression of considerable extent overlying West and South-West Bengal, Baghelkhand, and the east of the North-Western Provinces. Heavy rain had fallen over a large part of Bengal.

This depression affected a large area of country, rain extending into the Central Provinces, Central India and Eastern Rajputana, while the indraught of monsoon winds from the Arabian Sea occasioned a slight increase in the rainfall over the Peninsula.

The storm advanced west-north-westward during the next 24 hours, and at 8 A.M. on the 8th lay over the region represented by the stations of Mainpuri, Lucknow, Benares, Jubbulpore and Jhansi. Rain had ceased to a considerable extent in Bengal, but had become much heavier over the North-Western and Central Provinces.

In the Punjab the rainfall had ceased, but in the Peninsula, though the amounts remained exceedingly light for the time of year, the rainfall area had extended somewhat. By the morning of the 9th the storm had become much smaller and slighter, but it had continued to move west-north-westward, and at 8 A.M. was central near Agra. Its most marked effect was to give heavy rain to Eastern Rajputana, the only heavy fall which this region received during the whole month. The following gives the heaviest downpours in this region :—

DISTRICT OR STATE.	Station.	Rainfall during 24 hours preceding 8 A.M. of 9th July.
		Inches.
Jaipur	Chatsu	5'44
Do.	Unlara	5'00
Do.	Malpura	3'42
Do.	Jaipur	3'03
Alwar	Thana Gharzi	2'78
Kotah	Atroo	7'65
Do.	Indurgarh	6'00
Tonk	Tonk	4'05
Bharatpur	Bhasawar	3'40
Do.	Wair	2'77
Deoli	Deoli	3'13
Ajmer-Merwara	Bhinal	2'82
Do. do.	Masuda	2'77

The rainfall at this time was very light in Bengal, but continued moderate over the North-Western and Central Provinces and light to moderate along the West Coast. In the interior and east of the Peninsula there was no rain. By the next day the storm had filled up, but its effect on the weather remained and light to moderate general rain continued to fall over the greater part of Northern and Central India and light rain over the Peninsula.

The humid monsoon currents were mainly determined to Burma and North-East India, where moderate rain was falling. Within this area of moderate rain a shallow depression was developed between the morning of the 12th and the morning of the 13th. The storm was central between Calcutta and Barisal and moderate to heavy rain was falling over Burma and Bengal.

During the period from the 14th to the 16th, the changes in North-East India were small in amount and the depression hardly changed its position though it gradually filled up. During the four days of its existence rain fell steadily over Bengal, the North-Western Provinces and the Submontane Punjab.

On the 17th two small depressions were shown, one over Central Bengal, the other over Oudh.

On the 18th the two depressions coalesced and the combined depression lay over the North-Western Provinces until the 21st. The depression occasioned the second burst of fairly general rain during the month, as during its existence general rain fell over Bengal, the North-Western and Central Provinces and Central India and extended into parts of the Punjab and the east of Rajputana.

There was little or no rain in the whole of North-Western, Central and Western India, the Deccan and Madras. At the same time there was a steady determination of humid air to Burma, North-East India and the Gangetic Plain where rain was of daily occurrence. The line of demarcation between these two sets of conditions was very sharply defined and the absence of rain and the high temperature in the Peninsula and North-West India contrasted with the daily rainfall and low temperature in the north-east and north were the most marked features of the meteorology of the month. The conditions lasted practically till the end of the month except that during the last few days, the break in the rains, dry westerly winds and excessive temperature extended northwards and eastwards invading the North-Western Provinces so that quite at the close of the month the rainfall area was restricted to Burma, Assam and Bengal.

The chief features of the rainfall of the month were:—

(1) General excess over the area which usually receives rain during this period from the Bay current.

(2) General deficiency over the area dependent on the Arabian Sea or Bombay current.

The following data illustrate the first feature:—

DIVISION.	RAINFALL.			
	Average actual, July.	Average normal, July.	Variation from normal.	Percentage variation from normal.
	Inches.	Inches.	Inches.	
Tenasserim	49'43	47'46	+2'17	+5
Lower Burma	22'22	23'06	-0'84	-4
Central Burma	11'41	12'46	-1'05	-8
Upper Burma	7'57	5'70	+1'87	+33
Arakan	60'79	48'32	+12'47	+26
Eastern Bengal	22'93	18'01	+4'92	+27
Assam Surma	25'13	19'10	+6'03	+32

DIVISION.	RAINFALL.			
	Average actual, July.	Average normal, July.	Variation from normal.	Percentage variation from normal.
	Inches.	Inches.	Inches.	
Assam Brahmaputra	17'52	15'64	+1'88	+12
Deltaic Bengal	19'82	11'81	+8'01	+68
Central Bengal	19'00	12'35	+6'65	+54
North Bengal	20'98	19'08	-0'92	-5
Chota Nagpur	15'37	14'15	+1'22	+9
South Bihar	22'20	12'29	+9'91	+81
North Bihar	22'27	13'06	+8'61	+63
Orissa	11'74	11'67	+0'07	+1
North-Western Provinces East	18'67	11'83	+6'84	+58
South Oudh	18'28	10'75	+7'53	+70
North Oudh	17'72	11'69	+6'03	+52
North-Western Provinces Central	14'18	11'79	+2'39	+20
Do. do. do. West.	7'26	8'85	-1'59	-18
Do. do. East Submontane	26'59	12'40	+14'19	+114
Do. do. West do.	14'63	14'07	-0'04	0

The rainfall was more or less seriously in defect in the remainder of India. The following gives a summary of the rainfall data for that large area:—

AREA.	RAINFALL.			
	Average actual, July.	Average normal, July.	Variation from normal.	Percentage variation from normal.
	Inches.	Inches.	Inches.	
Punjab	2'89	5'02	-2'13	-40
Rajputana	3'22	6'51	-3'29	-51
Sind	0	1'86	-1'86	-100
Kathiawar	0'54	11'27	-10'73	-95
Gujarat	0'96	18'46	-17'50	-95
Khandesh	2'06	7'67	-5'61	-73
Central India	7'77	13'53	-5'76	-43
Berar	2'35	11'59	-9'24	-80
Central Provinces	8'14	15'97	-7'83	-49
Bombay Deccan	2'22	9'29	-7'07	-76
Hyderabad	1'05	7'42	-6'37	-78
Madras Deccan	0'50	3'21	-2'71	-84
Malabar	15'74	35'63	-19'89	-56
Konkan	9'63	40'04	-30'41	-76
Madras (South)	0'64	1'03	-0'39	-38
„ East-Coast North	4'42	6'66	-2'24	-34
„ „ „ Central	0'84	2'45	-1'61	-66
„ „ „ South	2'08	3'15	-1'07	-34

The deficiency was hence greatest in the north-western and central districts of the area dependent on the Bombay monsoon current, including Kathiawar, Gujarat, Khandesh, Berar, Rajputana, the Deccan and Konkan.

August.—A small depression was lying over the North-Western Provinces at the commencement of the month and was occasioning moderate rain over North-East India.

The depression filled up during the 3rd. It was followed by a fair flow of air from the Bay into North-East India, which consequently received steady rain. The above conditions lasted until the 6th, during which period there was an almost complete break in the rains in all parts of the country, except the north-east.

On the 7th a depression began to form over the east of the Bay. It was shown close to Diamond Island on the morning of the 8th, on which day it commenced to move north-westwards across the Bay. It reached the Orissa Coast near Puri about noon of the 10th, passed into the Central Provinces on the 11th, and the North-Western Provinces on the 12th, and then filled up. The storm completely broke down the excess of pressure over the Indian region and produced a large area of relatively low readings over Northern India. These changes brought about a marked change in the winds over the Peninsula, which shifted from north-west to south-west. Rain commenced along the West Coast on the 7th, extended over a large part of the Peninsula and to parts of the Central Provinces on the 9th, and was fairly general over the Peninsula, the central parts of the country, Bihar, Bengal, Assam and Burma on the 11th and 12th.

With a few local exceptions the rainfall during the existence of the storm was not very heavy.

On the 14th the general conditions were less abnormal than for sometime previously, and fairly general light to moderate rain was falling, except over North Bombay, Rajputana, the south and west of the Punjab and the centre and east of the Peninsula. These moderately favourable conditions did not, however, last long. The period from the 14th to 20th was marked by steadily diminishing rainfall, and at the close of the period, there was practically no rain except in North-East India and a few insignificant showers along the West Coast. On the 15th heavy rain was reported over Bihar, and within this area of heavy rain a small depression was formed. This depression drifted into Bengal and remained stationary over Central Bengal till the 19th, when it filled up. It gave heavy rain to Bengal and Bihar.

From the 21st to the 25th the general conditions were practically unchanged. The whole of North-West India was dry and hot, while showers prevailed on the coasts of the Peninsula and at some central stations and general rain over Burma and North-East India.

On the 26th a large shallow low pressure area covered

the head of the Bay, South-West and West Bengal and the east of the North-Western Provinces. During the following 24 hours the depression slightly intensified and a slight centre was shown over the north-west of the Bay. The centre crossed the coast near Puri during the 28th advancing in a north-westerly direction, and lay half-way between Sutna and Hazaribagh at 8 A.M. on the 29th. During the next 48 hours the storm advanced eastward and was filling up over Central Bengal at 8 A.M. on the 31st. The storm occasioned a marked increase of rain over the Central Provinces, Central India, the North-Western Provinces and Bihar, where rain was urgently needed.

No rain fell during this period over North-West India and the greater part of the Peninsula, and rain ceased suddenly over the central parts of the country on the 31st.

The chief features of the distribution of the rainfall of the month were similar to those of the preceding month with the exception that the area of increased or excessive rainfall in North-Eastern India was smaller than in July and included the Assam Valley and Hills, the greater part of Bengal, Tenasserim, Upper Burma, North Bihar and the eastern submontane districts of the North-Western Provinces. The following gives data for this area of normal or increased rainfall:—

DIVISION.	RAINFALL.			
	Average actual, August.	Average normal, August.	Variation from normal.	Percentage variation from normal.
	Inches.	Inches.	Inches.	
Tenasserim	43'43	37'81	+5'62	+15
Lower Burma	18'86	20'75	-1'89	-9
Central „	9'88	13'53	-3'65	-27
Upper „	7'57	6'61	+0'96	+15
Arakan	32'13	32'45	-0'32	-1
Assam Surma	17'20	20'97	-3'77	-18
„ Brahmaputra	16'51	14'27	+2'24	+16
„ Hills	24'35	22'95	+1'40	+6
Eastern Bengal	19'46	16'27	+3'19	+20
Deltaic „	10'99	12'19	-1'20	-10
Central „	11'25	11'42	-0'17	-1
North „	22'11	17'07	+5'04	+30
North Bihar	19'83	12'31	+7'52	+61
North-Western Provinces (Sub-montane East.)	14'94	10'78	+4'16	+39

The area of deficient rainfall included nearly five-sixths of India. The deficiency was, as in July, most marked in the north-western and central districts of the area dependent on the Bombay current, including the South Punjab, Rajputana, Central India, Gujarat, Kathiawar, Khandesh,

Berar, the Bombay Deccan and the western division of the Central Provinces.

The following gives data for these areas :—

AREA.	RAINFALL.			
	Average actual, August 1899.	Average normal, August.	Variation from normal.	Percentage variation from normal.
	Inches.	Inches.	Inches.	
North-Western Provinces and Oudh (excluding east submontane districts)	6'32	10'51	- 4'19	-40
Punjab	1'53	5'02	- 3'49	-70
Sind	0'01	1'94	- 1'93	-99
Rajputana	0'15	6'76	- 6'61	-98
Central India	2'91	12'28	- 9'37	-76
Kathiawar	0'34	6'28	- 5'94	-95
Gujarat	0'96	9'28	- 8'32	-90
Khandesh	1'82	5'90	- 4'17	-70
Malabar	10'54	20'95	-10'41	-50
Konkan	10'20	23'96	-13'76	-57
Bombay Deccan	1'55	6'14	- 4'59	-75
Berar	2'44	8'89	- 6'45	-73
Central Provinces	8'73	11'76	- 3'03	-26
Hyderabad	4'51	7'16	- 2'65	-37
Madras East Coast (North)	6'84	7'01	- 0'17	- 2
„ „ „ (Central)	2'51	3'05	- 0'55	-18
„ (Central)	2'54	4'32	- 1'78	-41
„ (South)	0'61	1'90	- 1'29	-68

September.—At the commencement of the month, over the east of the Bay ordinary monsoon winds from south and south-west were blowing steadily and a fair amount of rain was falling over Burma, Assam and Bengal.

On the 4th pressure became unusually low over the south-west of the Bay, the wind shifted more to the northward over the interior of the Peninsula, and rain set in over Madras and the Deccan.

Rain fell off in the Peninsula on the 7th, but recommenced on the 8th, on which day pressure was slightly to considerably below the normal over the south of the Peninsula and the south of the Bay. On the next day a depression was apparently developing over the Bay. Accompanying the development of this depression, rain ceased in Bengal, though it continued to fall over Burma and the Peninsula.

The depression over the Bay intensified slightly on the 9th, and was marching towards the Circars Coast on a west-by-north course on the morning of the 10th, on which day general light to moderate rain was falling over the west and centre of the Peninsula. During the following day (the 11th) the centre of the storm was crossing the coast between Gopalpur and Vizagapatam, moderate rain had commenced over the east of the Peninsula and rain had again extended into Bengal.

The storm reached the Central Provinces on the 13th, and the North-Western Provinces on the 14th, then turned to the eastward and travelled through Bihar, where it disappeared on the 17th.

During the 15th and 16th when the storm was travelling eastward the rainfall almost ceased over the Peninsula, but on the 17th it recommenced and, as in the preceding instance, was followed by the appearance of a depression over the Bay. The storm thus initiated concentrated during the 19th and 20th and began to move northward to the head of the Bay on the 21st. It was approaching the head of the Bay on the morning of the 22nd and was crossing the Sunderbans at 8 A.M. on the 23rd. The storm continued to advance northward and broke up in the Sikkim Himalayas on the morning of the 25th.

It occasioned heavy rain over Bengal and Bihar where the following amounts exceeding 10 inches in 24 hours were registered :—

DISTRICT.	STATION.	Date.	Rainfall during 24 hours preceding 8 A.M. of date.
			Inches.
SONTHAL PARGANAS .	Mohagama	24th Sept.	15'61
	Barkope	„ „ .	12'35
BHAGALPUR	Banka	„ „ .	11'81
SONTHAL PARGANAS .	Godda	„ „ .	10'12
	Darjeeling	25th „ .	19'40
DARJEELING	Kurseong	„ „ .	15'18
	Mungpoo	„ „ .	12'76
PURNEA	Forbesganj	„ „ .	10'60

The rainfall of the month was in excess in Upper and Lower Burma, Assam and the greater part of Bengal and Bihar, but the excess was small in actual amount except in the area or districts affected by the downpours of the

storm of the 24th and 25th. The following gives comparative data for this area:—

DIVISION.	RAINFALL.			
	Average actual, September 1899.	Average normal, September.	Variation from normal.	Percentage variation from normal.
	Inches.	Inches.	Inches.	
Lower Burma . . .	14'21	13'52	+0'69	+ 5
Upper Burma . . .	8'89	7'20	+1'69	+23
Assam Surma . . .	17'49	16'49	+1'00	+ 6
Assam Brahmaputra . .	12'38	11'13	+1'25	+11
Eastern Bengal . . .	12'74	11'02	+1'72	+16
Deltaic Bengal . . .	8'41	8'50	—0'09	— 1
Central Bengal . . .	9'36	9'24	+0'12	+ 1
North Bengal . . .	19'66	15'38	+4'28	+28
North Bihar . . .	10'76	9'27	+1'49	+16
South Bihar . . .	5'37	6'96	—1'59	—23

Data are given below for the districts which received heavy downpours from the storms of the month:—

DISTRICT.	STATION.	RAINFALL.			
		Average actual, September 1899.	Average normal, September.	Variation from normal.	Percentage variation from normal.
		Inches.	Inches.	Inches.	
SONTHAL PARGANAS.	Godda . . .	18'23	8'87	+ 9'36	+106
	Madhipura . . .	17'38	10'22	+ 7'16	+ 70
	Supaul . . .	18'30	9'59	+ 8'71	+ 91
BHAGALPUR.	Protapganj . . .	16'45	11'04	+ 5'41	+ 49
	Bhagalpur . . .	17'02	7'37	+ 9'65	+131
	Banka . . .	17'09	8'36	+ 8'73	+104
DARJEELING.	Darjeeling . . .	36'42	17'31	+19'11	+110
	Kalimpong . . .	26'40	11'94	+14'46	+121

The heavy downpours appear to have been very local and in one case, at least, are known to have occurred only from its effects, *vis.*, the subsequent flood. An excessive downpour occurred in a part of the Sonthal Parganas which gave rise to a tremendous flood that completely swept away the crops of a part of the Bhagalpur district and caused much loss of cattle. The rainfall of the month was also in excess over the greater part of the Peninsula south of Lat. 18°N, due to the favourable showers in the first fortnight of the month. The

following gives data for the areas of increased rainfall in the Peninsula:—

DIVISION.	RAINFALL.			
	Average actual, September 1899.	Average normal, September.	Variation from normal.	Percentage variation from normal.
	Inches.	Inches.	Inches.	
Bombay Deccan . . .	6'87	5'53	+1'34	+24
Madras „ . . .	7'74	4'85	+2'89	+60
Hyderabad . . .	4'46	6'78	—2'32	—34
Mysore . . .	8'59	4'82	+3'77	+78
Madras East Coast, Central.	3'70	3'61	+0'09	+ 2
Madras East Coast, South.	5'39	4'50	+0'89	+20

Over the remainder of India the rainfall was more or less largely in defect and the drought over the greater part of India was as severe as during the two preceding months:—

AREA.	RAINFALL.			
	Average actual, September 1899.	Average normal, September.	Variation from normal.	Percentage variation from normal.
	Inches.	Inches.	Inches.	
Punjab . . .	0'31	2'60	—2'29	— 88
North-Western Provinces and Oudh.	2'02	6'57	—4'55	— 69
Rajputana . . .	0'34	2'69	—2'35	— 87
Central India . . .	1'79	7'07	—5'28	— 75
Khandesh . . .	2'15	6'97	—4'82	— 69
Gujarat . . .	1'13	8'03	—6'90	— 86
Kathiawar . . .	0'84	4'70	—3'86	— 82
Sind . . .	0	0'48	—0'48	—100
Berar . . .	1'61	7'34	—5'73	— 78
Central Provinces . .	2'27	8'11	—5'84	— 72
Orissa . . .	5'38	12'70	—7'32	— 58
Chota Nagpur . . .	3'65	8'21	—4'56	— 56
Madras East Coast (North)	5'73	6'70	—0'97	— 14
Madras (South) . . .	1'55	2'11	—0'56	— 27
Malabar . . .	7'20	10'44	—3'24	— 31
Konkan . . .	5'57	14'96	—9'39	— 63

The following gives the chief features of the distribution of rainfall for the whole monsoon period, June to September and also June to October in India.

(1) The rainfall of the period June to October was in

slight to moderate defect in Burma and normal in Tenasserim as shown below :—

DIVISION.	RAINFALL OF PERIOD.							
	JUNE TO SEPTEMBER.				JUNE TO OCTOBER.			
	Average actual 1899.	Average normal.	Variation from normal.	Percentage variation from normal.	Average actual 1899.	Average normal.	Variation from normal.	Percentage variation from normal.
Tenasserim	Inches. 155.71	Inches. 143.79	+ 0.72	+ 4	Inches. 160.68	Inches. 159.72	+ 0.96	+ 1
Lower Burma	61.75	76.51	-14.76	-19	65.37	85.35	-19.98	-23
Central Burma	38.44	46.87	-8.43	-18	40.54	53.00	-12.46	-24
Upper Burma	31.49	25.53	+ 5.96	+ 23	37.12	43.63	-6.51	-15
Arakan	123.90	154.21	-30.31	-19	135.21	163.64	-28.43	-17

(2) It was on the mean of the whole period, June to October, in slight to considerable excess in Assam, Bengal, Bihar and the eastern districts of the North-Western Provinces :—

AREA.	RAINFALL OF PERIOD.							
	JUNE TO SEPTEMBER.				JUNE TO OCTOBER.			
	Average actual 1899.	Average normal.	Variation from normal.	Percentage variation from normal.	Average actual 1899.	Average normal.	Variation from normal.	Percentage variation from normal.
Assam	Inches. 78.59	Inches. 68.36	+ 10.23	+ 15	85.03	73.23	+ 11.80	+ 16
Bengal	66.24	55.45	+ 10.79	+ 19	71.63	60.05	+ 11.58	+ 19
Bihar	56.97	40.57	+ 16.40	+ 40	57.89	43.27	+ 14.62	+ 34
North-Western Provinces (East).	43.17	33.84	+ 9.33	+ 28	43.47	36.02	+ 7.45	+ 21
North-Western Provinces, East Submontane.	54.42	36.63	+ 17.79	+ 49	55.43	39.50	+ 15.93	+ 40

(3) It was in slight to moderate defect over nearly the whole of Chota Nagpur and Orissa. The following gives comparative data :—

AREA.	RAINFALL OF PERIOD.							
	JUNE TO SEPTEMBER.				JUNE TO OCTOBER.			
	Average actual 1899.	Average normal.	Variation from normal.	Percentage variation from normal.	Average actual 1899.	Average normal.	Variation from normal.	Percentage variation from normal.
Chota Nagpur	Inches. 39.49	Inches. 44.46	-4.97	-11	Inches. 40.32	Inches. 47.36	-7.04	-15
Orissa	35.58	45.46	-9.88	-22	44.42	51.31	-6.89	-13

(4) It was normal in the central districts of the North-Western Provinces and in moderate defect in the western and hill districts of the North-Western Provinces, as shown below :—

DIVISION.	RAINFALL OF PERIOD.							
	JUNE TO SEPTEMBER.				JUNE TO OCTOBER.			
	Average actual 1899.	Average normal.	Variation from normal.	Percentage variation from normal.	Average actual 1899.	Average normal.	Variation from normal.	Percentage variation from normal.
North-Western Provinces (Central).	Inches. 32.57	Inches. 31.37	+ 1.20	+ 4	32.57	32.41	+ 0.16	0
North-Western Provinces West Submontane.	29.26	40.24	-10.98	-27	29.48	41.07	-11.59	-28
North-Western Provinces, Hills.	43.79	49.16	-5.37	-11	43.82	50.67	-6.85	-14
North-Western Provinces, West.	17.73	23.52	-5.79	-25	17.74	24.06	-6.32	-26

(5) The rainfall of the period was, relatively to the normal, in very large defect in Rajputana, the South Punjab, Central Punjab, South-East Punjab, Sind, Kathiawar, Gujarat and Central India. The following gives comparative data :—

DIVISION.	RAINFALL OF PERIOD.							
	JUNE TO SEPTEMBER.				JUNE TO OCTOBER.			
	Average actual 1899.	Average normal.	Variation from normal.	Percentage variation from normal.	Average actual 1899.	Average normal.	Variation from normal.	Percentage variation from normal.
South-East Punjab.	Inches. 9.86	Inches. 20.40	-10.54	-52	9.91	20.76	-10.85	-52
South Punjab	5.27	13.00	-7.73	-59	5.33	13.21	-7.88	-60
Central Punjab.	6.26	13.65	-7.39	-54	6.30	14.00	-7.70	-55
Sind	0.04	4.48	-4.44	-99	0.04	4.51	-4.47	-99
Kathiawar	5.39	25.51	-20.12	-79	5.47	26.20	-20.80	-79
Gujarat	11.82	42.03	-30.21	-72	11.85	43.39	-31.54	-73
Central India	26.38	39.40	-13.02	-33	26.38	40.95	-14.57	-36
Rajputana East, Central India West.	14.08	25.85	-11.77	-46	14.09	26.19	-12.10	-46
West Rajputana	2.15	11.08	-8.93	-81	2.15	11.15	-9.00	-81

The deficiency was largest and most pronounced in West Rajputana, Sind and Kathiawar, in which it exceeded 78 per cent.

(6) It was below the normal in Khandesh, Berar, the Central Provinces, the Bombay and Madras Deccan, East

Coast, North, South and South Central Madras, the Konkan, Mysore and Hyderabad. The following gives data in illustration :—

DIVISION.	RAINFALL OF PERIOD.							
	JUNE TO SEPTEMBER.				JUNE TO OCTOBER.			
	Average actual, 1899.	Average normal.	Variation from normal.	Percentage variation from normal.	Average actual, 1899.	Average normal.	Variation from normal.	Percentage variation from normal.
	Inches.	Inches.	Inches.		Inches.	Inches.	Inches.	
Berar . . .	10'73	34'99	-24'26	-69	10'75	37'48	-26'73	-71
Central Provinces (West).	16'50	39'97	-23'47	-59	16'52	42'05	-25'53	-61
Central Provinces (Central)	24'49	47'05	-22'56	-48	24'49	48'90	-24'41	-50
Central Provinces (East).	33'51	44'49	-10'98	-25	33'55	46'55	-13'00	-28
Konkan . . .	51'44	106'10	-54'66	-52	53'09	111'62	-58'53	-52
Bombay Deccan	15'76	26'76	-11'00	-41	16'74	31'76	-15'02	-47
Khandesh . .	11'84	26'32	-14'48	-51	11'94	29'93	-17'99	-60
Hyderabad (North).	14'40	30'71	-16'31	-53	14'44	33'46	-19'02	-57
Hyderabad (South).	13'52	22'45	-8'63	-38	13'98	25'52	-11'54	-45
Madras East Coast (North).	20'21	25'23	-5'08	-20	25'14	32'39	-7'25	-22
Madras Central	11'77	15'53	-3'76	-24	13'94	21'12	-7'18	-34
Madras South .	3'16	6'10	-2'94	-48	11'69	12'13	-0'44	-4
Madras South (Central).	10'08	12'05	-1'97	-16	14'54	17'93	-3'39	-19
Mysore . . .	17'52	20'35	-2'84	-14	20'87	25'88	-5'01	-19

The deficiency was most marked in Berar, in which it averaged 71 per cent, Khandesh (60 per cent.) and the western division of the Central Provinces (61 per cent.)

(7) It was in slight excess over nearly the whole of the centre and south of the Peninsula including East Coast South and Central divisions of Madras as shown below chiefly due to heavy rain in :—

DIVISION.	RAINFALL OF PERIOD.							
	JUNE TO SEPTEMBER.				JUNE TO OCTOBER.			
	Average actual, 1899.	Average normal.	Variation from normal.	Percentage variation from normal.	Average actual, 1899.	Average normal.	Variation from normal.	Percentage variation from normal.
	Inches.	Inches.	Inches.		Inches.	Inches.	Inches.	
Madras East Coast (Central.)	7'78	10'77	-2'99	-28	20'86	20'53	+0'33	+2
Madras East Coast (South)	10'53	14'94	-4'41	-30	25'76	23'73	+2'03	+9

(8) The rainfall of the period, June to October, was below the normal in 39 divisions. The deficiency was small in amount in thirteen of these divisions, and ranged between 25 and 50 per cent in the eleven divisions for which comparative data are given below :—

DIVISION.	RAINFALL OF PERIOD, JUNE TO OCTOBER.			
	Average actual, 1899.	Average normal.	Variation from normal.	Percentage variation from normal.
North-Western Provinces West . . .	Inches. 17'74	Inches. 24'06	Inches. -6'32	-26
North-Western Provinces West Submontane.	29'48	41'07	-11'59	-28
Punjab Hills	30'04	45'12	-15'08	-33
Malabar	82'78	113'58	-30'80	-27
Bombay Deccan	16'74	31'76	-15'02	-47
Central Provinces Central	24'49	48'90	-24'41	-50
„ „ East	33'55	46'55	-13'00	-28
Central India East	26'38	40'95	-14'57	-36
Rajputana East and Central India West .	14'09	26'19	-12'10	-46
Hyderabad South	13'98	25'52	-11'54	-45
Madras Central	13'94	21'12	-7'18	-34

(9) It was more than 50 per cent. in defect in the 15 divisions for which comparative data are given below :—

DIVISION.	RAINFALL OF PERIOD, JUNE TO OCTOBER.			
	Average actual, 1899.	Average normal.	Variation from normal.	Percentage variation from normal.
South-East Punjab	Inches. 9'91	Inches. 20'76	Inches. -10'85	-52
South „	5'33	13'21	-7'88	-60
Central „	6'30	14'00	-7'70	-55
Punjab Submontane	12'19	24'96	-12'77	-51
West Punjab	2'48	6'25	-3'77	-60
Konkan	53'09	111'62	-58'53	-52
Hyderabad, North	14'44	33'46	-19'02	-57
Khandesh	11'94	29'93	-17'99	-60
Berar	10'75	37'48	-26'73	-71
Central Provinces, West	16'52	42'05	-25'53	-61
Gujarat	11'85	43'39	-31'54	-73
Kathiawar	5'40	26'20	-20'80	-79
Sind	0'04	4'51	-4'47	-99
Baluchistan Hills	0'45	2'48	-2'03	-82
West Rajputana	2'15	11'15	-9'00	-81

IV. The retreating south-west monsoon period.—This season was remarkably dry over by far the greater part of India.

The distribution of rainfall in October was exceptional, due chiefly to the abnormal tracks of the storms of the period. Two storms formed in the Bay during the month. The first storm was generated in the south-west or centre

of the Bay, and advanced by a curved path first northwards to Ganjam and thence north-north-eastwards through Orissa and Bengal where it broke up in the eastern districts on the 17th. It gave excessive rain in the North Madras coast districts and Orissa and heavy rain in Bengal.

The second disturbance was of an unusual character. It accompanied the formation and existence of a diffused and extensive barometric depression over the south and centre of the Bay which however never developed into a cyclonic storm or circulation with a well defined centre. Heavy rain fell in the Madras coast districts from the 19th to the 29th during the existence of the depression and moderate rain in Bengal and Assam.

Moderate rain also fell in South Madras and Burma during the first week of the month previous to the formation of the first storm. A feeble disturbance gave light to moderate rain in the North-West Himalayas on the 20th and 21st.

The rainfall of the month was in moderate to considerable excess of the normal in the south and south-east of the Peninsula and was normal in Malabar. It was also in slight to large excess in Orissa, Assam and East Bengal, and was normal in Upper Burma and Deltaic Bengal. In all other parts of the Indian region the rainfall was more or less deficient and was actually or practically *nil* in North-Western India. The deficiency was largest in actual amount in Burma.

November was drier than usual over the whole country. Only one storm formed in the Bay during the month. It was apparently a large diffused disturbance during the greater part of its existence. A small central disturbance of considerable intensity apparently formed within this on the 11th and passed over Negapatam during the next 24 hours. This was followed by a moderate burst of rain in South Madras.

Four cold weather disturbances affected the weather slightly in Upper India. They gave cloud in the plains and light rain or snow, chiefly in Kashmir and Chitral.

Upper Burma and Arakan had unusually heavy and favourable rain chiefly due to local conditions. Little or no rain fell over the whole of Northern and Central India and the Peninsula to the north of Lat. 16° N. To the south of Lat. 16° N., the rainfall was light to moderate and much below the normal of the month. Malabar, South Central and Central Madras and Mysore received amounts averaging between $\frac{1}{4}$ inch and $\frac{1}{2}$ inch, and Travancore, the central and south divisions of the Madras coast districts and South Madras moderate rain ranging from 1 to 4 $\frac{1}{2}$ inches in amount.

Over the large area including Bengal, Orissa, the Gangetic Plain, the Punjab, Rajputana, Central India, the Deccan and the West Coast the rainfall was less than 10 per cent. of the normal and was *nil* over by far the greater part of that area.

No rain fell over by far the greater part of India in December.

Three cold weather disturbances, feeble in character, gave rain or snow in Rajputana, Kashmir, Chitral and Baluchistan.

The first disturbance gave local showers in West and Central Rajputana from the 12th to the 14th. The second and third disturbances occurred during the fourth week of the month and gave rain and snow in Baluchistan and snow in the higher and interior ranges of Kashmir. Some light showers of little importance were received, chiefly between the 4th and 8th, in Upper Burma and Assam.

A diffused and irregular disturbance in the extreme south of the Bay gave moderate to heavy rain in the South Coromandel coast districts including South Arcot and Tanjore, and also in East Ceylon.

The rainfall in the south occurred generally before and that in the north-west generally after the 15th of the month. The total rainfall of the month was in slight excess in Assam and in North Bengal and the Bengal hills, but was in defect in all the remaining provinces. The largest actual deficiency was reported from the south and south-east of the Peninsula, where the rainfall due to the retreating south-west moonsoon ended earlier and was throughout lighter than usual. In this respect the rainfall of December 1899 was in marked contrast to that of December 1898, when Southern India received abundant rainfall.

The following are the chief features of the rainfall of the period in India :—

(1) The rainfall of the period was in marked defect in the Upper India Himalayas. The most noteworthy feature of the period was the abnormal dryness and absence of rain in the Western Himalayas during the months of November and December. The following gives data for eleven representative stations :—

STATION.	VARIATION OF RAINFALL FROM NORMAL.				
	October 1899.	November 1899.	December 1899.	Total of period October to December.	Percentage variation from normal of period.
Quetta . . .	Inches. +0'02	Inches. +0'27	Inches. -0'11	Inches. +0'18	+ 17
Kalat . . .	-0'45	+0'45	0	+0'40	+ 39
Chaman . . .	-0'32	-0'32	-0'69	-1'10	- 58
Peshin . . .	-0'30	-0'30	-1'09	-1'41	- 65
Srinagar . . .	-0'91	+0'91	-0'39	+0'36	+ 21
Leh . . .	-0'03	-0'03	-0'13	-0'40	- 80
Kailang . . .	-0'05	+0'05	-0'79	-0'87	- 40
Kilba . . .	-1'97	-1'97	-1'24	-3'64	- 83
Simla . . .	-0'54	-0'54	-0'74	-2'29	- 92
Chakrata . . .	-0'59	-0'59	-0'66	-1'82	- 87
Ranikhet . . .	-0'33	-0'33	-0'53	-2'34	-100

(2) The rainfall of the whole period was very small in amount and in marked defect over the large area including North-Western and Central India and the Deccan. The following gives comparative data for this area of large deficiency:—

AREA.	AVERAGE ACTUAL RAINFALL IN			Average actual rainfall during period October to December 1899.	Average normal rainfall during period October to December.	Percentage variation from normal.
	October 1899.	November 1899.	December 1899.			
	Inch.	Inch.	Inch.	Inch.	Inches.	
Bihar	0'93	0	0	0'93	3'01	-69
Chota Nagpur	0'83	0	0	0'83	3'61	-77
North-Western Provinces and Oudh.	0'26	0	0	0'26	1'93	-87
Punjab	0'10	0'02	0'02	0'14	0'89	-84
Bombay	0'46	0'01	0'01	0'48	3'59	-87
Rajputana	0'01	0	0'05	0'06	0'58	-90
Central India	0	0	0'04	0'04	2'27	-98
Berar	0'02	0	0	0'02	3'67	-99
Central Provinces . .	0'02	0	0	0'02	2'76	-99
Hyderabad	0'10	0	0	0'10	4'63	-98

(3) The precipitation varied somewhat irregularly from the normal in Bengal, Orissa and Assam. It was in large excess in East Bengal, the Assam Valley and Hills, chiefly due to heavy local precipitation accompanying the storm of the 12th to the 16th October. The following gives data:—

AREA.	AVERAGE ACTUAL RAINFALL IN			Average actual rainfall during period October to December 1899.	Average normal rainfall during period October to December.	Percentage variation from normal.
	October 1899.	November 1899.	December 1899.			
	Inches.	Inch.	Inch.	Inches	Inches.	
Assam (Surma)	6'82	0'04	0'52	7'38	7'02	+ 5
Assam (Brahmaputra) .	6'07	0'51	0'72	7'30	4'89	+49
Assam (Hills)	11'31	0'81	0'56	12'68	9'35	+36
Eastern Bengal	11'95	0'24	0'08	12'27	7'29	+68
Deltaic Bengal	4'41	0	0	4'41	5'60	-21
Central Bengal	2'67	0	0	2'67	4'23	-37
North Bengal	2'52	0'01	0'13	2'66	4'85	-45
Bengal Hills	5'37	0'37	0'52	6'26	7'85	-20
Orissa	8'84	0	0'03	8'87	8'26	+ 7

(4) The precipitation in Burma was unusual in its distribution. Upper Burma obtained abundant and favourable rain in October and November. The

rainfall in these months was, on the other hand, in moderate to considerable defect in Lower Burma. Little or no rain fell in December. On the mean of the period the rainfall was practically normal in amount in Arakan, in considerable to large defect in Tenasserim, Lower and Central Burma and in considerable excess in Upper Burma. The following gives comparative data:—

AREA.	AVERAGE ACTUAL RAINFALL IN			Average actual rainfall of period October to December 1899.	Average normal rainfall of period October to December.	Percentage variation from normal.
	October 1899.	November 1899.	December 1899.			
	Inches.	Inches.	Inch.	Inches.	Inches.	
Tenasserim	4'97	3'23	0'04	8'24	12'13	-32
Lower Burma, Deltaic .	3'62	1'89	0	5'51	12'59	-56
Upper „	5'63	2'87	0'16	8'66	5'76	+50
Central „	2'10	0'91	0	3'01	8'10	-63
Arakan	11'31	2'28	0	13'59	13'34	+ 2

(5) The rainfall in Southern India occurred chiefly in the coast districts. There was a moderate to large excess in the coast districts south of Nellore in October. The precipitation was small in amount in November and December and was hence in general defect in that area, the deficiency in actual amount increasing westwards from the narrow coast belt. The following gives comparative data for the Madras Presidency and Mysore:—

DIVISION.	VARIATION OF RAINFALL DURING			
	October 1899.	November 1899.	December 1899.	Period.
	Inches.	Inches.	Inches.	Inches.
Madras (South)	+2'50	-3'35	-2'93	-3'78
Do. East-Coast (South.)	+6'44	-6'13	-3'54	-3'23
Do. East-Coast (Central.)	+3'32	-8'22	-2'67	-7'57
Do. (Central)	-3'42	-2'12	-0'45	-5'99
Do. (South Central).	-1'42	-3'52	-0'65	-5'59
Do. East-Coast (North.)	-2'17	-3'24	-0'97	-6'38
Mysore	-2'17	-2'42	-0'52	-5'11
Malabar	+0'34	-3'83	-0'72	-4'21

Year.—The rainfall of the year for the whole of India as determined by the method employed by Mr. Blanford (and which gives the normal annual rainfall as 41'09 inches) averaged 11'14 inches below the normal.

The average rainfall of the Indian area was more or less considerably below the normal throughout the year except during the hot weather season.

The following gives comparative data for the whole of India (excluding Burma) based on the arithmetical means of the actuals and normals for the 46 rainfall divisions (irrespective of extent of area) :—

PERIOD.	RAINFALL.			
	Average actual of year 1899.	Average normal of year.	Variation from normal.	Percentage variation from normal.
	Inches.	Inches.	Inches.	
Cold weather . . .	0'71	0'98	—0'27	—28
Hot weather . . .	5'28	4'57	0' 71	+16
South-West Monsoon .	31'07	37'67	—6'60	—18
Retreating South-West Monsoon.	0'29	1'86	—1'57	—84
Whole year . . .	37'35	45'08	—7'73	—17

The year 1899 was in fact the driest on record since the establishment of the present meteorological system. An examination of all the available records shows that it was the driest during the past 200 years at least.

The rainfall of the year was more or less in excess over nearly the whole of the area which usually derives its rainfall solely from the Bay current, including Upper Burma, Assam, Bengal, Bihar and the eastern half of the North-Western Provinces. The following gives data for this area of increased rainfall :—

DIVISION.	RAINFALL.			
	Average actual of year 1899.	Average normal of year.	Variation from normal.	Percentage variation from normal.
	Inches.	Inches.	Inches.	
Upper Burma . . .	50'48	37'70	+12'78	+34
Eastern Bengal . . .	109'60	88'29	+21'31	+24
Assam Surma . . .	136'36	126'61	+ 9'75	+ 8
Assam Hills . . .	149'81	138'13	+11'68	+ 8
Assam Brahmaputra .	101'75	87'91	+13'84	+16
Deltaic Bengal . . .	73'22	60'55	+12'67	+21
Central Bengal . . .	62'70	56'28	+ 6'42	+11
North Bengal . . .	104'03	94'70	+ 9'33	+10
Bengal Hills . . .	139'47	138'25	+ 1'22	+ 1
Bihar South . . .	55'95	43'89	+12'06	+27
Bihar North . . .	71'08	52'47	+18'61	+35
North-Western Provinces, East.	45'97	38'29	+ 7'68	+20
Oudh South . . .	39'47	36'11	+ 3'36	+ 9
Oudh North . . .	43'08	38'95	+ 4'13	+11
North-Western Provinces East Sub-montane.	59'64	42'53	+17'11	+40

The total rainfall of the year was in defect over the remainder of the country. It was less than 25 per cent. in defect in the following ten rainfall divisions :—

DIVISION.	RAINFALL.			
	Average actual of year 1899.	Average normal of year.	Variation from normal.	Percentage variation from normal.
	Inches.	Inches.	Inches.	
Orissa	54'41	61'67	— 7'26	—12
Chota Nagpur	45'14	53'64	— 8'50	—16
North-Western Provinces, Central	33'53	34'31	— 0'78	— 2
„ „ Hills	51'09	61'19	—10'10	—17
Malabar	101'53	128'62	—27'09	—21
Madras, South-Central . . .	23'38	29'45	— 6'07	—21
Mysore	28'45	34'37	— 5'92	—17
Madras, East Coast, North .	31'03	40'44	— 9'41	—23
„ „ „ South	37'53	42'50	— 4'97	—12
„ South	25'85	28'58	— 2'73	—10

It was between 25 and 50 per cent. in defect in 14 divisions, as shown below :—

DIVISION.	RAINFALL.			
	Average actual of year 1899.	Average normal of year.	Variation from normal.	Percentage variation from normal.
	Inches.	Inches.	Inches.	
North-Western Provinces, West .	18'98	26'33	— 7'35	—28
North-Western Provinces, West Submontane.	32'41	46'28	—13'87	—30
Punjab Hills	37'80	61'59	—23'79	—39
North Punjab	15'58	21'15	— 5'57	—26
Konkan	58'09	115'06	—56'97	—50
Bombay Deccan	20'88	36'49	—15'61	—43
Central Provinces, Central . .	25'93	51'58	—25'65	—50
„ „ East	36'31	50'03	—13'72	—27
Gujarat	12'14	44'03	—13'89	—32
Central India, East	27'03	43'41	—16'38	—38
Rajputana East and Central India West.	14'74	28'18	—13'44	—48
Hyderabad, South	16'17	29'46	—13'29	—45
Madras, Central.	17'89	25'58	— 8'69	—33
Madras, East Coast, Central .	25'59	35'19	— 9'60	—27

It was more than 50 per cent. in the following divisions

(thirteen in number) which formed the area of greatest drought during the year and over which serious famine consequently set in :—

DIVISION.	RAINFALL.			
	Average actual of year 1899.	Average normal of year.	Variation from normal.	Percentage variation from normal.
	Inches.	Inches.	Inches.	
South-East Punjab	10'52	23'54	—13'02	—55
South „	5'76	16'02	—10'26	—64
Central „	7'67	18'88	—11'21	—59
Punjab Submontane	14'42	31'30	—16'88	—54
West Punjab	3'78	8'90	—5'12	—58
Hyderabad, North	17'70	37'19	—19'49	—52
Khandesh	13'43	32'77	—19'35	—59
Berar	12'81	40'56	—27'75	—68
Central Provinces, West	17'99	44'62	—26'63	—60
Kathiawar	5'79	27'07	—21'28	—79
Sind	0'77	6'00	—5'23	—87
Baluchistan Hills	4'58	9'44	—4'86	—51
West Rajputana	2'47	12'55	—10'03	—80

The rainfall of the year was less than one inch in amount at a considerable number of the rain-gauge stations in West Rajputana and Sind and at a few stations in the Punjab, Cutch and Baluchistan. The following gives data for these stations :—

PROVINCE.	STATION.	Total annual rainfall.
		Inch.
PUNJAB	Montgomery	0'99
	Tarkhani	0'74
	Khewra	0'90
	Dehra Ghazi Khan	0'46
	Jampur	0'78
	Rajanpur	0'21
	Alipur	0'14
	Sinanwan	0'24
	Lodhran	0'50
	Babar Kach	0'78
BALUCHISTAN	Nari	0'60
	Mittri	0'06
	Lindsay	0'10
	Bellput	0
	Temple Dera	0'55
	Jhatput	0'25

PROVINCE.	STATION.	Total annual rainfall.
RAJPUTANA	Jaisalmer	Inch. 0'26
	Davikot	0'70
	Balmer	0'39
	Pachpadra	0'95
	Jodhpur	0'96
	Jodhpur (Sursagar)	0'45
	Pali	0'72
	Sankra	0'14
	Sheo	0'14
	Jalor	0'50
	Chotan	0'81
	Ramgarh	0
	Khabra	0
	Bhuj	0'98
CUTCH	Mandvi	0'84
	Rahpur	0'06
	Nalia	0
	Karachi	0'59
SIND	Tatta	0'65
	Jerruck	0'46
	Shahbandar	0'17
	Sehwan	0'46
	Hyderabad	0'40
	Nanshahro	0'73
	Mehar	0'91
	Rohri	0'17
	Umarkot	0'06
	Nagar Parkar	0'66

The rainfall was excessive in the Assam Hills, Arakan and Tenasserim. The following gives the most noteworthy examples in these areas and in Bengal and Bombay.

PROVINCE.	STATION.	RAINFALL.
		Actual of year 1899.
BURMA	Tavoy	Inches 221'26
	Thayetchaung	220'84
	Launglon	232'06
	Yebyu	258'43
	Kyaikto	203'84
	Sandoway	234'83
	Myebon	225'93
	Akyab	227'66
	Maungdaw	203'10

PROVINCE.	STATION.	RAINFALL.	
		Actual of year 1899.	Normal of year.
		Inches.	Inches.
BENGAL . . .	Buxa	195'52	212'86
	Kurseong . . .	192'85	
	Cox's Bazar . .	193'75	140'78
BOMBAY . . .	Malcolmpeth . .	139'60	
	Cherra Poonjee .	641'91	425'77
	Litlyngkot . . .	208'88	
ASSAM . . .	Jowai	188'97	269'37
	Pathalipan . . .	196'12	
	Jotinga Valley .	203'80	
	Nematha	218'06	186'00
	Lalakhal	295'66	
	Sunamganj . . .	274'32	210'25
	Kachugaon . . .	201'89	

The following gives the heaviest rainfalls in 24 hours exceeding 15 inches recorded during the year 1899:—

PROVINCE.	DISTRICT.	STATION.	Date and month.	Rainfall during 24 hours preceding S.A.M. of date.
				Inches.
ASSAM . . .	Khasia and Jaintia Hills, Sylhet . . .	Cherra Poonjee	7th June.	18'21
		Lalakhal . . .	8th „ „	17'20
CENTRAL INDIA.	Gwalior . . .	Bujirangrah .	20th „ „	15'05
ASSAM . . .	Khasia and Jaintia Hills.	Cherra Poonjee.	1st Sept.	17'33
		„ „ . . .	15th „ „	18'41
BENGAL . . .	Southal Parganas .	Mohagama . .	24th „ „	15'61
		Darjeeling . .	25th „ „	19'40
		Kurseong . . .	„ „ „	15'18

The following gives a statement of the variation of the mean rainfall of India (excluding Burma) during the past 25 years:—

YEAR.	NUMBER OF DIVISIONS.			RAINFALL.			
	Fall excessive.	Fall normal.	Fall deficient.	Average actual 1899.	Average normal.	Variation from normal.	Percentage variation.
				Inches.	Inches.	Inches.	
1875	16		8	43'47	41'09	+2'38	+ 6
1876	6		18	36'60	41'09	-4'49	-11
1877	10		14	36'81	41'09	-4'28	-10
1878	17	1	6	47'43	41'09	+6'34	+15
1879	16	2	6	42'78	41'09	+1'69	+ 4
1880	13	1	10	39'53	41'09	-1'56	- 4
1881	15		9	41'19	41'09	+0'10	0
1882	17	1	6	43'73	41'09	+2'64	+ 6
1883	11	1	12	40'97	41'09	-0'12	0
1884	12		10	42'82	41'09	+1'73	+ 4
1885	15		7	42'14	41'09	+1'05	+ 3
1886	14		8	44'11	41'09	+3'02	+ 7
1887	11		11	43'51	41'09	+2'42	+ 6
1888	10		12	39'55	41'09	-1'54	- 4
1889	15		8	43'50	41'09	+2'41	+ 6
1890	14	1	8	41'77	41'09	+0'68	+ 2
1891	6		17	37'55	41'09	-3'54	- 9
1892	15		8	46'18	41'09	+5'09	+12
1893	22		1	50'16	41'09	+9'07	+22
1894	17		6	47'56	41'09	+6'47	+16
1895	5		17	38'90	41'09	-2'19	- 7
1896	7	2	14	36'26	41'09	-4'83	-12
1897	10	2	11	40'94	41'09	-0'15	0
1898	10	3	10	41'52	41'09	+0'43	+ 1
1899	6		17	29'95	41'09	-11'14	-27

Concluding Summary.

I.—Cold Weather Period, January and February 1899.—The following table gives mean variation data of the more important meteorological elements for the cold weather period, January and February 1899:—

METEOROLOGICAL PROVINCE.	MEAN VARIATION FROM NORMAL DURING COLD WEATHER PERIOD JANUARY AND FEBRUARY.						
	Mean pressure.	Mean maximum temperature.	Mean minimum temperature.	Mean aqueous vapour pressure.	Mean humidity.	Mean cloud amount.	Total rainfall.
Burma Coast and Bay Islands.	—0.020	—0.2	0	+0.015	0	—0.3	—0.85
Burma Inland . . .	—0.012	—0.5	0				—0.07
Assam	—0.024	—0.8	—1.8				—0.39
Bengal and Orissa . .	—0.026	—1.3	—0.3	+0.004	0	+0.7	+0.55
Gangetic Plain and Chota Nagpur.	—0.029	—0.8	—0.3	0	—1	0	—0.03
Upper Sub-Himalayas .	—0.024	0	—1.0	—0.039	—6	—1.0	—1.98
Indus Valley and North-West Rajputana	—0.020	+1.3	—1.7	—0.015	—3	—1.9	—0.47
East Rajputana, Central India and Gujarat.	—0.017	+0.4	—1.0	—0.061	—9	—1.2	—0.39
Deccan	—0.019	+0.1	—1.1	—0.076	—8	—0.3	—0.33
West Coast	—0.018	—0.5	—0.5	—0.057	—4	—0.2	+0.79
South India	—0.022	—0.2	+0.5	—0.010	0	+0.6	—0.30
Extra-Tropical India .	—0.023	—0.2	—1.2	—0.025	—4	—0.7	—0.45
Tropical India	—0.015	—0.3	—0.2	—0.027	—3	—0.1	—0.15
Whole India	—0.021	—0.2	—0.7	—0.026	—4	—0.3	—0.32

The deficiency was greatest in East Rajputana, Central India and Gujarat, the Deccan and West Coast. Humidity was below the normal in all divisions except Burma, Bengal and South India where it was normal on the mean of the period. The decreased humidity was most marked in the Deccan, East Rajputana, Central India and Gujarat. There was also less cloud than usual over the whole area except Bengal, the Gangetic Plain, Chota Nagpur and South India. The deficiency was very marked in the area of greatest reduction of the night temperature below the normal including Sind, Rajputana, Gujarat and Central India. The rainfall of the period was more or less in defect over the whole of India with the exception of Bengal, Orissa and the West Coast, in which areas it was in slight to moderate excess.

The chief features of the cold weather season were the prevalence of less disturbed weather than usual in January and the occurrence of a series of feeble storms in February.

A reference to the monthly weather summaries for the year 1899 will show that there was a considerable resemblance between the cold weather period of that year and those of the years 1892, 1896, 1897 and 1898. These periods were with one exception marked by a considerable excess of temperature and by decreased humidity and cloud in North-Western India. The following gives comparative data for the cold weather periods of the years 1892 to 1899 for the area including the Punjab, Rajputana, the North-Western Provinces and Bihar.

COLD WEATHER PERIOD OF	VARIATION FROM NORMAL IN NORTH-WESTERN INDIA OF			
	Temperature.	Humidity.	Cloud.	Rainfall.
	°			Inches.
1899	—0.5	— 6	—0.9	—0.51
1898	+1.1	— 1	—1.0	+1.22
1897	+1.2	— 2	—0.4	—0.12
1896	+2.0	— 3	—0.5	—0.72
1895	+0.8	+ 5	—0.2	+0.43
1894	+0.6	+10	+1.3	+0.92
1893	—4.2	+11	+1.4	+2.04
1892	+2.5	— 2	—0.2	—0.37

The variations of the temperature and humidity conditions in the cold weather of 1898-99 were determined by the distribution of the rainfall during the period, and hence by the distribution and character of the cold weather storms of December 1898 and of January and February 1899.

The pressure variations were slight to moderate in amount. Pressure was below the normal over the whole of India. The deficiency was greatest in the Gangetic Plain and Chota Nagpur and least in the interior of Burma.

The mean maximum temperature of the period was in defect over the greater part of India. The deficiency was greatest in Bengal and Orissa where it averaged 1°.3. It was in excess in Sind, Rajputana, Central India, Gujarat and in the Deccan, generally by small amounts. The excess was most marked in the Indus Valley and North-West Rajputana where it was 1°.3 in average amount. The mean minimum temperature of the period was normal or in defect over the whole area except South India. The deficiency was greatest in amount in Sind, Rajputana, Central India, Gujarat and the Deccan and also in Assam in which it ranged between 1° and 2°.

The air contained less aqueous vapour than usual over the whole of India except Burma and Bengal where the amount was practically normal and the Gangetic Plain and Chota Nagpur where it was identical with the normal.

The chief characteristics of the storms of that period were as follows :—

- (1) The number of depressions and cold weather disturbances was less than the normal, more especially in January. Two appeared in January and six in February.
- (2) The disturbances were (with one exception) feeble and ill-defined, and did not give rise to deep secondary depressions in the Punjab. The disturbances in January originated in Berar and the Central Provinces and gave rain in North-East India.
- (3) The precipitation accompanying these disturbances in the Afghan and Himalayan areas fell as rain to much higher levels than in normal cold weather periods.
- (4) The precipitation accompanying these disturbances in January occurred chiefly in North-Eastern India and in February in Northern India and was most general and heaviest in Assam.

The preceding remarks indicate that the chief features of the cold weather storms of 1898-99 were persistent throughout the season.

An examination of the pressure and other conditions obtaining in India before and during the cold weather periods of these two years throws little or no light on the abnormal features of these storms, and hence suggests that they were related either to conditions in the upper atmosphere over Northern India, or to conditions outside of India.

The following table gives vertical pressure anomalies for the cold weather period of 1898-99 :—

Pair of stations.	VERTICAL PRESSURE ANOMALY.						
	September 1898.	October 1898.	November 1898.	December 1898.	January 1899.	February 1899.	Mean of period November 1898 to February 1899.
	"	"	"	"	"	"	"
Leh and Lahore.	+ '011	+ '075	+ '048	— '032	+ '019	+ '118	+ '038
Quetta and Jacobabad.	+ '020	+ '034	+ '033	+ '009	+ '010	+ '057	+ '027
Murree and Peshawar.	— '022	+ '002	— '002	— '026	— '040	+ '020	— '012
Simla and Ludhiana.	+ '009	+ '010	+ '015	+ '002	— '043	+ '046	+ '005
Chakrata and Roorkee.	+ '013	+ '031	+ '036	+ '017	— '024	+ '048	+ '019
Ranikhet and Bareilly.	— '006	+ '010	+ '020?	+ '015	— '026	+ '035	+ '011
Darjeeling and Dhubri.	— '036	— '010?	— '021	— '006	— '032	+ '021	— '010
Mount Abu and Deesa.	— '018	0	+ '009	— '007	— '030	+ '004	— '006
Pachmarhi and Hoshangabad.	— '017	— '012	0	— '016	— '041	— '004	— '015

The following table gives the mean vertical pressure anomalies for the cold weather periods, November to February of the past eight years for comparison :—

Pair of stations.	VERTICAL PRESSURE ANOMALY.							
	1898-99.	897-98.	1896-97.	1895-96.	1894-95.	1893-94.	1892-93.	1891-92.
	"	"	"	"	"	"	"	"
Leh and Lahore.	+ '038	+ '040	+ '013	+ '041	+ '009	— '004	— '046	+ '040
Quetta and Jacobabad.	+ '027	+ '050	— '007	+ '019	+ '001	+ '006	— '007	+ '063
Murree and Peshawar.	— '012?	+ '041	+ '006	+ '022	— '006	?	?	?
Simla and Ludhiana.	+ '005	+ '019	— '003	+ '012	— '017	— '015	— '049	+ '017
Chakrata and Roorkee.	+ '019	+ '028	+ '023	+ '030	+ '010	— '010	— '022	+ '039
Ranikhet and Bareilly.	+ '011	+ '018	+ '021	+ '025	+ '003	+ '011?	+ '013?	+ '030
Darjeeling and Dhubri.	— '010	?	+ '004	+ '007	+ '001	+ '017	— '008	+ '026
Mount Abu and Deesa.	— '006	— '002	— '008	+ '005	— '007	+ '003	?	+ '027
Pachmarhi and Hoshangabad.	— '015	— '017	+ '013	?	+ '013	?	+ '005	+ '024

Hence in the cold weather of 1898-99 the vertical pressure anomalies in North-Western India were generally positive and moderate to considerable in amount, indicating increased pressure in the middle atmospheric strata relatively to the lower strata. The feature was slightly exhibited in September and was persistent in October and November. There was a tendency to a change to the opposite condition in January at all the groups of stations except Leh and Quetta, but the feature was fully re-established in February.

The relative excess of pressure was moderate in October and November 1898 and moderately large in February 1899. The cold weathers of 1895-96 and of 1896-97 bear on the whole the closest resemblance to that of 1898-99.

The rainfall of the cold weather seasons of 1896-97 and 1895-96 in Upper India was below the normal.

The rainfall of the cold weather of 1898-1899 was considerably below the normal over the greater part of Northern and Central India excepting Bengal.

An examination of the Indian monsoon area charts and of the charts in the weekly weather reports issued by the English Meteorological Office indicates the conditions which obtained in Europe during the inception of the storms of the period.

The following table gives a list of the more important cold weather storms of 1898-99 and of the conditions

obtaining in South-East and South Europe during the formation.

Date and character of storm.	Area of formation.	Weather conditions in East, South-East and South Europe, prior to and during the formation of storm.
Feeble cold weather depression of the 1st to the 4th January in Berar, the Central Provinces and Bengal.	Berar and the Central Provinces.	Well marked anticyclonic conditions prevailed over South-East and South Europe throughout the month of January except for a short period from the 2nd to the 4th when a depression affected Central Europe, South Russia and the Balkan Peninsula.
Feeble disturbance of the 5th to the 8th in Berar, the Central Provinces and Bengal.	Berar and the Central Provinces.	
Feeble cold weather storm of the 2nd to the 4th February.	Baluchistan and Sind.	High pressure conditions obtained over the south east of Europe from the 1st to 3rd of February.
Cold weather storm of the 4th to the 6th February.	Upper Sind and North and East Baluchistan.	A small depression lay over and in the neighbourhood of Italy on the 3rd and 4th. It was practically stationary and filled up during the 4th.
Cold weather storm of the 6th to the 8th in Persia and 9th to the 13th February in Northern India and Burma.	Asiatic Turkey.	Strongly pronounced anti-cyclonic conditions prevailed over the whole of South, South-East and East Europe between the 5th and 16th.
Cold weather storm of the 11th and 12th February in Persia and 13th to the 17th in Northern India and Burma.	West Persia.	
Feeble disturbance of the 18th and 19th February.	Upper Sind.	A depression formed over the Black Sea during the 17th. It, however, filled up rapidly during the 18th without changing its position.
Cold weather storm of the 21st and 22nd in Persia and 23rd to the 27th in Baluchistan and Northern India.	Asiatic Turkey.	A storm lay over the Baltic sea on the 20th. It was displaced slowly eastwards to West and Central Russia on the 21st and southwards to South Russia on the 22nd. It filled up slowly over the Black Sea, Asia Minor and the south of Russia during the next two days.

The preceding data indicate clearly that the cold weather storms of 1898-99 in India were not the continuation of European storms and that anti-cyclonic conditions prevailed to the north and north-west of Baluchistan or Persia during their initiation.

The preceding discussion has shown that the scanty rainfall during the greater part of the cold weather of 1898-99 was associated, as in previous years of similar conditions, with certain pressure conditions in the middle and probably the higher atmospheric strata. The small table in page 787 shows that the cold weather rainfall was below the normal in North-Western India during the cold weather periods of 1891-92, 1895-96, 1896-97 and 1898-99. The same was the case in the cold weather of the present year, 1899-1900, which may hence be added to the group of years of deficient winter rains in North-Western India. The following data will show that the deficiency was as

marked in Baluchistan and Persia as in India so far as is indicated by the available data :—

STATION OR PROVINCE.	RAINFALL OF PERIOD DECEMBER TO FEBRUARY.						
	Normal of period.	Variation from normal in					
		1891-92.	1895-96.	1896-97.	1897-98.	1898-99.	1899-1900.
	Inches.	Inches.	Inches.	Inches.	Inches.	Inches.	Inches.
Baghbad .	6'03		+0'51	-2'78	-2'10	-4'50	-3'28
Teheran .	3'49		-0'68	+0'98	-1'03	-0'53	-0'36
Ispahan .	0'60		-0'15	+0'08	+1'07	+0'09	+0'71
Bushire .	9'61	-5'89	-6'33	-3'49	-6'86	-4'30	+2'84
Jask .	2'47		-1'34	-0'80	-2'36	-1'97	+3'54
Quetta .	5'05	-3'21	+0'34	-0'77	-2'30	-2'61	+0'20
Kashgar .	0'69		-0'74	-0'20	-0'82	-0'82	+0'22
Kalat .	5'11			-2'30	-3'37	-2'93	-2'70
Chaman .	4'63		-2'26	-0'05	-3'03	-1'39	+1'54
Kabul .	1'85		-1'85	+4'95	-1'47	-1'85	-2'10
Punjab .	2'22	-1'47	-0'59	+0'17	+7'63	-0'83	-0'63
Rajputana .	0'78		-0'38	-0'27	+0'24	-0'32	-0'68
Sind .	0'82	-0'63	-0'23	-0'65	-0'20	-0'78	+1'06
North-Western Provinces and Oudh.	1'52	-0'43	-1'05	+0'21	+1'26	-0'26	-0'79

STATION.	RAINFALL OF PERIOD OCTOBER TO MARCH.						
	Normal of period.	Variation from normal in					
		1891-92.	1895-96.	1896-97.	1897-98.	1898-99.	1899-1900.
	Inches.	Inches.	Inches.	Inches.	Inches.	Inches.	Inches.
Baghdad .	9'03		+2'61	-5'03	-3'18	-6'25	-4'07
Teheran .	7'73		-0'52	+0'99	-0'67	-3'33	-2'73
Ispahan .	3'27	-4'56	+0'85	+1'73	-0'26	-1'65	-0'24
Bushire .	13'30		-7'67	+4'49	-5'30	-4'76	+0'91
Jask .	4'35	-4'15	-0'73	+2'11	-1'91	-2'96	+2'43
Quetta .	7'09		+1'74	+0'45	-0'76	-2'49	-0'60
Kashgar .	1'05		-0'61	+0'50	?	-1'18	+0'06
Kalat .	7'08		?	+3'08	-3'07	-4'67	-3'40
Chaman .	6'59		-2'39	+0'03	-2'96	-2'17	+0'18
Kabul .	8'73		+2'27	+2'60	-4'30	-4'50	-3'63

The data of the two preceding tables show conclusively that the winter rainfall and precipitation of the cold weather of 1898-99 was even more largely in defect in Asiatic Turkey, Persia, Baluchistan and probably Afghanistan than in North-Western India and the Western Himalayas. It also indicates that in the very dry winter of 1891-92 the deficiency was also as marked in these

areas as in North-Western India. The facts hence point strongly to the conclusion that deficient cold weather rainfall in North-Western India is not a local incident but is associated with deficiency over the large area to the west of Northern India, including Persia, Baluchistan and Asiatic Turkey, and hence that it is not due to abnormal conditions affecting North-Western India only, but to conditions of a much more general character which have not yet been fully investigated.

It may be noted that the relations indicated above have been established by many years' experience and were utilized in the preparation of a forecast of these cold weather rains which was in very fair agreement with fact.

II.—Hot weather, March to May 1899.—The following table gives the mean variations of the more important and meteorological elements in the eleven meteorological provinces of India for the hot weather period March to May 1899 :—

METEOROLOGICAL PROVINCE.	MEAN VARIATION FROM NORMAL DURING HOT WEATHER PERIOD, MARCH TO MAY.							
	Mean pressure.	Mean maximum temperature.	Mean minimum temperature.	Mean aqueous vapour pressure.	Mean humidity.	Mean cloud amount.	Total rainfall.	Percentage variation from normal.
Burma Coast and Bay Islands.	-.022	-0.9	+1.2	+.027	+3	+0.4	Inches. +11.34	+71
Burma Inland.	-.007	-0.2	+0.8				+4.18	+63
Assam.	-.016	+0.3	+0.1				-2.84	-10
Bengal and Orissa.	-.018	+0.4	+0.7	+.020	0	+0.2	+0.95	+8
Gangetic Plain and Chota Nagpur.	-.013	-0.1	+1.1	+.018	0	+0.3	+1.36	+54
Upper Sub-Himalayas.	-.010	+1.6	+2.8	-.012	-5	-0.3	-1.29	-50
Indus Valley and North-West Rajputana.	-.024	+2.4	+2.4	+.028	-2	-0.6	-0.49	-38
East Rajputana, Central India and Gujarat.	-.006	+0.5	+1.8	+.003	-1	-0.9	-0.14	-20
Deccan.	0	-0.6	+0.7	+.002	+1	+0.1	+0.16	+8
West Coast.	0	-0.3	-0.2	-.023	-3	0	+4.81	+63
South India.	-.004	-1.3	-0.6	-.033	+1	+0.6	+2.01	+47
Extra-Tropical India.	-.015	+0.9	+1.5	+.011	-2	-0.3	-0.41	-9
Tropical India.	-.007	-0.7	+0.4	-.007	+1	+0.3	+4.50	+50
Whole of India.	-.011	+0.2	+1.0	+.003	-1	0	+1.82	+18

The previous table gives mean data for the whole period, and indicates that on the average of the period pressure was in slight defect, temperature generally in slight to moderate excess, humidity slightly to moderately below the normal and cloud and rainfall more or less below the normal in Upper and Central India, but in slight to moderate excess in Burma and the Peninsula.

The mean pressure of the Indian land area was '010"

in defect in March, '001" in defect in April, and '019" in defect in May and hence averaged '010" in defect for the hot weather period. Series of thunderstorms occurred at intervals in March and April in the Punjab, North-Eastern India and Southern India. Temperature was in general excess in March and May and more or less below the normal in April over the whole area except Upper India.

The local variations of pressure from the general condition in the months of March and April were small and apparently of little importance. The chief feature of the period was a general disturbance in the second week of the month of April which gave moderately heavy rain over the whole of North-Eastern India and the Peninsula. The month of May was considerably hotter than usual over the whole of Northern and Central India, and temperature was on the mean of the month in general excess. The excess was large in amount in the Punjab and moderate to considerable in the interior of Bengal. The hot weather conditions of May gave rise to the following abnormal features of the pressure distribution in that month:—

(1) General deficiency, relatively to the mean condition, over nearly the whole of Northern India and Burma, the deficiency being most marked in Bengal and the West Punjab.

(2) General excess of pressure in the Peninsula and Western India, greatest in the West Coast districts from Kathiawar to North Malabar.

(3) Excess of pressure at the level of the hill stations as compared with the neighbouring plains.

The following table gives comparative data of the month of May for eleven years which were in the great majority of cases characterized by increased temperature and decreased pressure over the Indian area—

MONTH AND YEAR.		VARIATION FROM NORMAL OF		
		Mean pressure of month.	Mean temperature of month.	Mean aqueous vapour pressure of month.
May 1879	.	-.045	+1.3	-.010
" 1880	.	-.022	+0.2	-.001
" 1881	.	+.002	+0.1	0
" 1882	.	+.006	-0.2	-.004
" 1890	.	-.022	+0.6	-.011
" 1892	.	-.027	+1.8	-.002
" 1894	.	-.023	+1.5	-.011
" 1895	.	-.007	+2.4	+.027
" 1896	.	+.013	+2.3	-.005
" 1897	.	-.004	+1.7	-.001
" 1898	.	-.003	+0.6	-.015
" 1899	.	-.019	+0.8	+.033

The following gives mean temperature variation data of Northern India (including the Punjab, Upper Sind, the North-Western Provinces, Bihar and Rajputana) for the month of May of eleven years resembling May 1899 in their chief features:—

MONTH AND YEAR.	Variation of mean temperature in Northern India.	Area of greatest variation.	Amount of greatest variation.
May	+4'0	North-Western Provinces	+5'0
" 1880	+2'0	South Punjab	+5'6
" 1881	+0'8	Do.	+2'9
" 1882	-0'5	North Punjab	+2'1
" 1890	+1'5	Punjab	+2'5
" 1892	+3'0	West Punjab	+5'5
" 1894	+3'0	Chota Nagpur	+5'0
" 1895	+4'0	Punjab	+6'0
" 1896	+3'1	Do.	+4'8
" 1897	+3'6	North-West Rajputana.	+5'5
" 1898	+0'8	Assam (Surma)	+3'0
" 1899	+3'3	Punjab (Central)	+6'3

The data of the preceding table show that the temperature conditions of May 1881, 1882, 1890 and 1898 were practically normal. In each of the months of May 1879, 1880, 1892, 1894, 1895, 1896, 1897 and 1899 temperature was considerably above the normal, due largely, if not solely, to deficient precipitation in the cold weather period over the plains and adjacent mountain areas of Northern India. In each of these months, except that of May 1896, the mean pressure of the Indian area was in defect, the deficiency averaging '028" for the first five years and almost identical in amount with this in four out of these five years.

Excessive temperature in the month of May generally gives rise to a larger diminution of pressure over the Indian

area than that normal to the month, and hence to a deficiency of pressure as compared with the normal. The decrease of pressure is chiefly, if not solely, a temperature effect.

This is confirmed by the fact that in each of these months (*viz.*, May 1879, 1880, 1890, 1892, 1894, 1895, 1896, 1897, 1898 and 1899) pressure was in relative excess or the vertical pressure anomalies were positive at the hill stations in Northern India. This is established by the following data for six pairs of stations:—

Pair of stations.	VERTICAL PRESSURE ANOMALY IN MAY.									
	1879.	1880.	1890.	1892.	1894.	1895.	1896.	1897.	1898.	1899.
Quetta and Jacobabad.	?	?	+0'06	+0'05	+0'37	+0'63	+0'46	+0'50	+0'12	+0'43
Leh and Lahore.	?	+0'69	+0'63	+0'125	+0'82	+0'101	+0'85	?	+0'03	+0'75
Murree and Rawalpindi.	+0'40	+0'38	+0'41	+0'35	+0'28	+0'57	?	+0'17	+0'01	+0'33
Simla and Ludhiana.	?	?	+0'33	+0'49	+0'42	+0'60	+0'50	+0'54	+0'09	+0'47
Chakrata and Roorkee.	+0'44	+0'15	+0'22	+0'40	+0'35	+0'45	+0'38	+0'58	+0'25	+0'45
Darjeeling and Calcutta.	+0'32	+0'07	+0'02	+0'03	+0'23	+0'33	+0'11	+0'28	+0'15	+0'25
Mean	+0'39	+0'32	+0'28	+0'50	+0'41	+0'66	+0'46	+0'41	+0'11	+0'45

The large positive vertical anomalies were evidently in each case the result of the temperature conditions of the month in Northern India, which, by the various air movements which it either strengthened or initiated, diminished pressure at the level of the plains in Northern India and to a smaller extent at the level of the hills, thus giving positive vertical pressure anomalies, which increased with elevation and were hence greatest for Leh.

A second interesting feature of the meteorology of the month of May in each of these years, except 1879, is that pressure was in local excess in the Peninsula, more especially in the West Coast districts, and in local defect in Northern India. The following table gives data in illustration:—

AREA.	STATION.	PRESSURE ANOMALY OF MAY.									
		1879.	1880.	1890.	1892.	1894.	1895.	1896.	1897.	1898.	1899.
NORTHERN INDIA.	Calcutta	+0'03	+0'02	-0'01	-0'19	-0'35	-0'24	-0'10	-0'07	-0'06	-0'23
	Patna	-0'14	+0'19	-0'13	-0'37	-0'55	-0'30	-0'23	-0'29	-0'18	-0'12
	Allahabad	-0'12	0	0	-0'30	-0'37	-0'40	-0'26	-0'28	-0'06	-0'09
	Lahore	-0'03	-0'30	-0'19	-0'36	-0'31	-0'38	-0'19	-0'20	+0'01	-0'09
	Mooltan	+0'13	-0'27	-0'16	-0'45	-0'36	-0'48	-0'31	-0'27	+0'08	-0'42
	Peshawar	+0'26	-0'36	-0'05	-0'29	-0'14	-0'22	-0'14	+0'11	-0'02	-0'45
	Rajkot	-0'14	+0'05	+0'44	+0'50	+0'59	+0'44	+0'41	+0'27	+0'25	+0'25
WESTERN INDIA AND MALABAR.	Bombay	-0'40	+0'12	+0'25	+0'21	+0'50	+0'43	+0'31	+0'24	+0'18	+0'23
	Karwar	?	+0'30	+0'31	+0'15	+0'50	+0'49	+0'33	+0'28	+0'14	+0'27
	Poona	+0'16	+0'12	+0'27	+0'35	+0'44	+0'30	+0'29	+0'19	+0'18	+0'19
	Belgaum	-0'22	-0'05	+0'14	+0'27	+0'47	+0'36	+0'35	+0'20	+0'32	+0'24
	Cochin	-0'07	-0'10	?	+0'36	+0'35	+0'34	+0'31	+0'07	+0'04	+0'27
	Calicut	?	?	?	+0'22	+0'35	+0'32	+0'27	+0'07	+0'04	+0'24

The preceding data establish that generally, if not invariably, exaggerated hot weather conditions in Northern India in May tend to give a larger deficiency of pressure in Northern India than the mean deficiency of the whole of India, and a smaller deficiency in the Peninsula (more especially in the West Coast districts), or in other words, to give negative pressure anomalies in Northern India and positive anomalies in the Peninsula. This is mainly, if not entirely, a result of increased temperature in the hot weather.

The experience of the year 1899, hence confirms the conclusions stated in the Annual Summary for 1898, that more strongly marked hot weather conditions than usual (*i. e.*, increased temperature and great dryness of the air) in Northern India in the month of May accompany or initiate the following pressure conditions :—

- (1) General deficiency of pressure over India.
- (2) Relative excess of pressure at the level of the hill stations in Northern India, as compared with that at the level of the plains.
- (3) Relative deficiency of pressure in Northern India, usually most marked in or near the area of greatest excess of temperature.
- (4) Relative excess of pressure in the Peninsula, greatest in amount in the West Coast districts Gujarat and Kathiawar.

The highest temperatures of the year were registered during the last week of May and the third week of June in Sind and the Punjab and in the second week of May in West Rajputana. Maximum temperatures exceeding 115° were registered at the following stations during the hot weather :—

PROVINCE.	STATION.	Highest maximum temperature recorded during the year.	Date on which recorded.
Punjab	Khushab . . .	118°9	27th May.
	Mooltan . . .	118°5	20th June.
	Montgomery . . .	117°5	27th May.
	Dera Ismail Khan . . .	117°2	27th May, 10th and 20th June.
	Lahore . . .	116°6	8th June.
	Sialkot . . .	115°9	10th June.
	Sirsa . . .	115°8	13th May.
	Peshawar . . .	115°5	20th June.
Sind . . .	Jacobabad . . .	123°0	20th June.
	Hyderabad . . .	118°7	17th May.
Rajputana . . .	Bikaner . . .	115°8	12th May, 20th and 21st June.
	Pachpadra . . .	115°8	16th May.
	Kotah . . .	115°6	13th May.
Asiatic Turkey . . .	Baghdad . . .	118°9	27th June.

The following table gives vertical pressure anomalies for each month of the hot weather period of 1899 in Northern India, determined from the variation data of six pairs of stations. It will be seen that the vertical pressure anomalies in Upper India, which were small and negative in April, were positive and large in amount in March and May :—

PAIR OF STATIONS.	Vertical pressure anomaly.			
	March.	April.	May.	Mean of period.
	"	"	"	"
Quetta and Jacobabad . . .	+ '035	+ '032	+ '043	+ '037
Leh and Lahore . . .	+ '063	— '013	+ '075	+ '042
Murree and Peshawar . . .	+ '007	— '007	+ '058	+ '019
Simla and Ludhiana . . .	+ '042	— '001	+ '047	+ '029
Darjeeling and Dhubri . . .	— '012	— '033	+ '035	— '003
Mount Abu and Deesa . . .	+ '015	0	— '021	— '002

The meteorology of India during the hot weather of 1899 was determined mainly, if not entirely, by meteorological actions and conditions in India itself and by the distribution of the cold weather snowfall in the Himalayan area.

The cold weather or winter snowfall was considerably below the normal in the Western Himalayas and Afghanistan mountains and the winter terminated earlier than usual in the latter area. The extent of the snow-clad surface was less than usual at the beginning of the winter and was hence considerably below the normal in the beginning of March. The disturbances in March and April gave a moderate and late general fall of snow in the Western Himalayas. The snow accumulation melted rapidly during the dry hot weather of May, and was again much below the normal at the end of the month. The general character of the weather in Northern India in these months and more especially in May was such as is invariably associated with deficient winter precipitation and early termination of the winter in the Western Himalayas.

A noteworthy feature was the increased rainfall in Burma, the Assam Valley and the greater part of Bengal during the hot weather. This is the rule in about four out of five years of deficient cold weather rains in North-Western India.

The larger features of this period were directly related to the snowfall of the previous cold weather season and to that of the second week of May in the North-West Himalayas.

The following gives rainfall variation data for Burma, Assam and Bengal :—

AREA.	RAINFALL.							
	March.		April.		May		Total of period.	
	Variation from normal.	Percentage Variation from normal.	Variation from normal.	Percentage variation from normal.	Variation from normal.	Percentage variation from normal.	Variation from normal.	Percentage variation from normal.
	Inches		Inches		Inches		Inches	
Burma Coast and Bay Islands.	+0.20	+30	+1.48	+58	+9.66	+76	+11.31	+71
Burma Inland . . .	-0.38	-93	-0.38	-28	+4.94	+101	+4.18	+63
Assam (Burma) . . .	-1.50	-18	+0.72	+6	-1.87	-11	-2.65	-7
Assam (Brahmaputra)	+0.66	+16	-0.13	-2	+1.28	+11	+1.81	+8
Eastern Bengal . . .	-1.50	-53	+2.72	+63	+3.62	+35	+4.84	+28
Deltaic Bengal . . .	-1.30	-76	+1.58	+68	+3.77	+61	+4.05	+40
Central Bengal . . .	-0.89	-86	+0.11	+7	-0.94	-18	-1.73	-22
North Bengal . . .	+0.40	+33	-0.2	-6	-2.62	-25	-2.46	-16

III. The south-west monsoon period, June to September 1899.—The meteorological conditions in the Indian land area antecedent to the establishment of the south-west monsoon were favourable to a normal monsoon and also to its rapid extension over nearly the whole of India.

The following gives the most prominent and important of these antecedent conditions :—

(1) The snowfall of the preceding winter was much less than usual over the whole of the Western Himalayas and also in Afghanistan, Baluchistan and Persia. It was probably in local excess in Kashmir and also in Kumaon and Garhwal. The snowfall was distributed fairly throughout the season, and there was no abnormal accumulation at the end of May, except perhaps on the higher ranges in Kashmir.

(2) The snowfall of the preceding winter was heavier than usual in the Sikkim and Assam Himalayas.

(3) The pressure conditions in India during the previous five months were such as accompany higher temperature in Northern India and less snowfall than usual in the Western Himalayas. The chief features, which were fairly persistent, were (a) general deficiency of pressure, (b) local deficiency in Northern India and Burma, most marked in Bengal and the Punjab, and (c) local excess in the Peninsula and Central India, greatest in Berar, the Konkan, Malabar and West Deccan.

(4) The temperature conditions during the previous five months were such as usually accompany a drier winter than usual in the Himalayan area—more especially on the lower and middle ranges. Temperature was in

moderate excess in February and March in Northern and Central India and in large excess in Upper India in May.

(5) The air was throughout nearly the whole season much drier than usual and skies remarkably free from cloud.

(6) The air movement was more vigorous than usual in March and May, due to the intensified thermal conditions of the period in the interior of India.

(7) The conditions in the Indian Seas and the Indian Ocean were, so far as could be ascertained, satisfactory and favourable, and indicated that the conditions in the south-east trades region were at least normal, and that the air movement in that area was somewhat stronger than usual.

The following were the inferences or forecast (prepared in the first week of June) of the probable distribution of the monsoon rainfall based on these conditions :—

“(1) Conditions are favourable to the prevalence of monsoon currents of at least normal strength in the Bay of Bengal. The rains will probably commence slightly before or about the normal date in Bengal (*i.e.*, the 15th of June).

“(2) Conditions are favourable to the prevalence of monsoon currents of at least normal strength in the Arabian Sea. They are also slightly more favourable in that sea than in the Bay. The influence of the late snowfall in April will very probably be very slight, and, so far as can be judged, the monsoon ought to set in on the Bombay Coast before the 8th of June.

“(3) Conditions are favourable in Burma, and it will probably receive at least normal rain. The rainfall is more likely to be in excess in Lower Burma than in Upper Burma.

“(4) Conditions are slightly unfavourable in North Bengal and Assam. The rainfall on the mean of the whole area will very probably not be above the normal and probably be in slight to moderate defect.

“(5) Conditions are favourable in West, South and East Bengal—more especially in the two latter areas, and the rainfall of the south-west monsoon period will be very probably normal and probably in excess in South and East Bengal, and normal or in slight defect in West Bengal and Orissa.

“(6) Conditions are slightly unfavourable in Bihar and Chota Nagpur, due to the deficiency of pressure in Bengal and Assam, and the rainfall on the average of the whole area will very probably not be above the normal, and probably be in defect to a slight extent. Conditions are slightly more favourable in Chota Nagpur than Bihar.

“(7) Conditions are, on the whole, favourable for normal rain in the North-Western Provinces. There is a slight probability, based chiefly on the pressure conditions in the Punjab, that the rainfall of the whole area may be in slight

to moderate excess. It is more probable the rainfall will be in excess in the western than the eastern districts.

"(8) Conditions are favourable in the Punjab. The pressure conditions of May (more especially the deficiency in the West Punjab) strongly resemble those of May 1880, 1892 and 1894. Comparison with these years indicates that the monsoon rainfall of the present year will probably be above the normal. The character of the rainfall in this area, however, depends chiefly on the general strength of the monsoon and not on the local conditions, and these conclusions should be suitably modified if the monsoon turns out to be much weaker than is anticipated in the forecast, in which case the rainfall may be below the normal to a moderate extent in the West and Central Punjab and normal or in slight defect in the East Punjab.

"(9) Conditions are, on the whole, favourable in Rajputana—more especially in the eastern and central districts, due to the same conditions as in the Punjab. The monsoon rainfall will hence very probably be at least normal in the eastern and central districts and probably in moderate excess. It will probably be about normal in the western states. The rainfall in these areas, as in the Punjab, depends chiefly on the general strength of the monsoon, and hence, if the Bombay monsoon current be weak, the rainfall will be normal or in slight defect.

"(10) Conditions are about as favourable in Central India as in the North-Western Provinces, and it is probable that it will receive at least normal rainfall. The rainfall is more likely to be in excess in the eastern than the western states.

"(11) Conditions are, on the whole, favourable in the Central Provinces and to a slightly less extent in Hyderabad. It is hence probable that they will receive at least normal rainfall. The conditions are more favourable in the eastern than the western districts of the Central Provinces, and it is hence probable that the eastern districts may receive rainfall in slight to moderate excess of the normal.

"(12) Conditions are not quite so favourable in Berar and Khandesh, and the rainfall in these areas will probably not be above the normal and may be in slight defect. They are also slightly unfavourable in the West Deccan, and that area will very probably not receive more than its normal fall and probably less.

"(13) The conditions in the west coast districts are such as are in normal monsoons associated with at least normal rainfall. It is hence very probable that the rainfall of the present year's south-west monsoon will be at least normal in those districts, and probably it may be in slight to moderate excess.

"(14) The variations of the rainfall in the North Madras coast districts are in at least five years out of six similar to those of Orissa and the Central Provinces. Conditions

appear to be on the whole favourable, and it is probable those districts will receive about normal rain.

"(15) A comparison of the conditions in the Madras Deccan, Mysore and the Carnatic with those of similar years indicates that the rainfall during the period—June to August—will probably be in slight defect—more especially in Mysore. It is, however, very difficult to forecast for this part of India, as rain in the southern half of the Peninsula during the monsoon proper occurs chiefly during the intervals of breaks in the rains of Northern India, and is hence essentially of irregular occurrence."

The forecast was a partial failure, as it was based on an erroneous estimate of the strength of the Bombay monsoon current and of the south-east trades due to absence of information from the latter area.

The following gives a brief summary of the chief features of the south-west monsoon period of 1899:—

METEOROLOGICAL PROVINCE.	VARIATION FROM NORMAL DURING SOUTH-WEST MONSOON SEASON, JUNE TO SEPTEMBER.						
	Mean pressure.	Mean maximum temperature.	Mean minimum temperature.	Mean aqueous vapour pressure.	Mean humidity.	Mean cloud amount.	Total rainfall.
Burma Coast and Bay Islands.	—'001	+0'7	+1'2	+0'14	—1	+0'3	—9'02
Burma Inland.	—'005	—0'4	+0'6				+3'34
Assam.	—'008	—1'8	—0'3				+8'25
Bengal and Orissa.	+0'02	+0'2	+0'3	+0'14	0	+0'3	+6'06
Gangetic Plain and Chota Nagpur.	+0'02	—0'1	—0'2	—0'20	—2	+0'2	+7'51
Upper Sub-Himalayas.	—'003	+2'3	+1'0	—0'61	—7	—1'1	—14'22
Indus Valley and North-West Rajputana.	0	+2'0	+1'0	+0'02	—2	—0'9	—5'30
East Rajputana, Central India and Gujarat.	+0'31	+3'1	+1'3	—0'90	—13	—1'4	—14'10
Deccan.	+0'34	+3'1	+1'2	—0'58	—10	—0'5	—17'16
West Coast.	+0'31	+1'1	+0'8	—0'38	—5	—1'1	—34'23
South India.	+0'18	+2'4	+1'1	—0'26	—5	+0'1	—4'98
Extra-Tropical India.	+0'04	+1'0	+0'5	—0'31	—5	—0'6	—2'00
Tropical India.	+0'05	+1'4	+1'0	—0'27	—5	—0'3	—12'41
Whole India.	+0'09	+1'1	+0'7	—0'29	—5	—0'5	—6'73

The large abnormal conditions of the period were mainly dependent upon the distribution of the rainfall during the period in Northern India, the chief features of which were very scanty rainfall and drought during the period, July to September, in the Bombay monsoon region

and heavier rainfall than usual in North-Eastern India and Upper Burma. These conditions were as follows:—

(1) Pressure was normal or in very slight defect on the mean of the period in the area of increased rainfall in Northern India and in moderate excess in the drought area in Western India and the Peninsula.

(2) Temperature was in slight to largish excess over the Peninsula and Western India, the increase being greater in the day than in the night temperature, and was most largely in excess in the drought area, including Berar, the Central Provinces, Bombay, Central India, Rajputana and the West and South Punjab.

(3) There was, on the whole, much less cloud than usual in Western India and the Peninsula, and the humidity was in considerable to large defect, accompanying diminished amount of aqueous vapour. The deficiency in the relative humidity was greatest in the drought area, in which it averaged 9 for the whole period.

(4) The rainfall was below the normal in seven provinces. The deficiency was small and unimportant in Burma Coast and Bay Islands. It ranged between 25 and 50 per cent. in the Upper Sub-Himalayas, Deccan, West Coast and South India, and exceeded 50 per cent. in the Indus Valley and North-West Rajputana and East Rajputana, Central India and Gujarat.

(5) The rainfall was in excess in the remaining four divisions by percentage amounts averaging 14.

The following table, giving comparative rainfall data of thirteen large political divisions for the period June to October 1899, gives a more satisfactory basis for the comparison of rainfall:—

RAINFALL OF SEASON JUNE TO OCTOBER.

PROVINCE	Average actual.	Average normal.	Variation from normal.	Percentage variation from normal.
	Inches.	Inches.	Inches.	
Burma	93'50	98'30	- 4'74	- 5
Assam	85'03	73'23	+ 11'80	+ 16
Bengal	71'63	60'05	+ 11'58	+ 19
Chota Nagpur	40'32	47'36	- 7'04	- 15
Bihar	57'89	43'27	+ 14'62	+ 34
North-Western Provinces and Oudh.	36'50	34'67	+ 1'83	+ 5
Punjab	7'58	15'24	- 7'66	- 50
Central Provinces	24'85	45'83	- 20'98	- 46
Central India	26'38	40'95	- 14'57	- 36
Rajputana	8'12	13'67	- 10'55	- 57
Berar	10'75	37'48	- 26'73	- 71
Bombay	16'51	41'24	- 24'73	- 60
Madras	27'82	34'49	- 6'67	- 19

The rainfall of the period, as indicated by this statement, was normal in amount (and also very favourably distributed in every respect) in Burma. It was in slight to considerable excess in Assam, Bengal, Bihar and the North-Western Provinces (due to increased rain in the eastern districts). The excess was large in Bihar (34 per cent.). The rainfall of the period was in very serious defect over nearly the whole of the Peninsula and North-West India, the deficiency ranging between 40 per cent. and 75 per cent. in the Punjab, Rajputana, Central India, Berar, the Central Provinces and Bombay.

The causes of the remarkable deficiency of the rainfall over North-Western, Central and Western India are discussed in the section entitled "Concluding remarks."

The initial burst of the south-west monsoon was undoubtedly weaker than usual. This was shown (1st) by its delay, (2nd) by the absence of cyclonic weather during its first advance over the Arabian Sea, and (3rd) by the unusually short period of the first and only strong advance of monsoon winds in that sea.

It has been stated above that conditions were extremely favourable in India for a strong monsoon and favourably distributed rainfall over practically the whole of India.

The combination of a South-East Trades circulation, slightly feebler than usual, at the commencement of the monsoon and of favourable conditions in India during the hot weather month of May 1899 appears to be sufficient to account for the following features of the rainfall of the month of June:—

(1) The slight delay in the establishment of the monsoon currents over the Indian seas and the coast districts of India in the beginning of June.

(2) Their rapid extension over the Indian land area to the limits of the Punjab in the third week of June.

(3) Heavier rainfall than usual not only in North-Eastern India, but also in the northern belt of the area dependent on the Bombay current, including the Punjab, Rajputana, Central India and the North-Western Provinces in the month of June.

These initial conditions fail to explain fully the following features of the remaining months of the south-west monsoon of 1899:—

(1) Normal or excessive rainfall in Burma and North-East India during the remainder of the monsoon season from July to September.

(2) Very scanty rainfall and more or less complete drought in the greater part of the area dependent on the Bombay current from July to September.

The chief feature of the south-west monsoon rainfall in 1899 was its more or less complete failure in North-Western and Western India and the Deccan.

The following gives average rainfall variation data for the two periods (a) June and (b) July to September in

thirteen political divisions in illustration of the preceding remarks:—

AREA.	RAINFALL.			
	JUNE.		JULY TO SEPTEMBER.	
	Actual variation.	Percentage variation.	Actual variation.	Percentage variation.
	Inches.		Inches.	
Punjab	+1'07	+ 63	- 8'52	-64
Rajputana	+1'90	+ 76	-12'25	-77
Central India	+7'39	+113	-20'41	-62
North-Western Provinces and Oudh.	+5'59	+129	- 2'50	- 9
Bihar	+3'47	+ 47	+12'93	+39
Chota Nagpur	+3'56	+ 43	- 8'53	-24
Bengal	+2'35	+ 16	+ 8'44	+21
Assam	+5'92	+ 30	+ 4'31	+ 9
Berar	-2'84	- 40	-21'42	-77
Central Provinces	-2'32	- 29	-16'68	-47
Bombay	+0'18	+ 2	-22'67	-74
Madras	-0'84	- 12	- 6'63	-34
Burma	-5'51	- 21	+ 3'1	+ 5

The preceding data indicate the increased rainfall in June over North-Western and Central India and the very scanty rainfall in July, August and September in North-Western and Western India and the Deccan.

The preceding remarks suggest that the failure of the south-west monsoon rainfall over the large area dependent upon the Arabian Sea monsoon current (including, it may be noted, the Abyssinian region) was not due to local conditions, but to conditions in the south-east trades.

The information at present available for discussing the meteorology of the south-east trades region of the Indian Ocean is very limited.

The following gives variation data of the Royal Alfred Observatory, Mauritius, for nine months of the year, deduced from a comparison of the means of 1899 with normal means based on the observations of the previous 25 years:—

MONTH.	Variation from normal of pressure.	Variation from normal of rainfall.	Percentage variation of rainfall.	Variation from normal of hourly wind velocity in miles.	Percentage variation of wind velocity.
	"	Inches.			
January 1899 . . .	-0'36	-4'87	-69	+1'8	+16
February „ . . .	-0'37	+0'38	+ 6	-1'7	-15
March „ . . .	-0'23	+3'87	+47	+0'3	+ 3
April „ . . .	-0'08	-0'84	-15	-0'7	- 7
May „ . . .	-0'07	-2'60	-60	-0'5	- 5
June „ . . .	-0'07	-0'34	-17	-1'2	-11
July „ . . .	+0'64	+0'66	+29	+2'0	+17
August „ . . .	+0'51	+0'94	+38	+2'3	+20
September „ . . .	+0'14	+0'24	+17	-0'2	- 2

The most remarkable feature of the meteorology of the period at Mauritius was the decreased air movement, rainfall and pressure in April, May and June immediately antecedent to the northward extension of the south-east trades across the equator. Winds were stronger than usual, and pressure above the normal in July and August.

In the following table a similar comparison is given for Zanzibar, the normal means being deduced from the observations of eight years:—

MONTH.	Variation from normal of pressure.	Variation from normal of rainfall.	Percentage variation of rainfall.	Variation from normal of hourly wind velocity in miles.	Percentage variation of wind velocity.
	"	Inches.			
January 1899 . . .	+0'24	- 1'61	- 55	-1'8	-22
February „ . . .	-0'32	- 2'96	- 99	+0'5	+ 8
March „ . . .	+0'05	+ 1'14	+ 22	-0'7	-12
April „ . . .	+0'08	+ 9'12	+ 77	+0'1	+ 1
May „ . . .	0	+10'43	+118	+1'4	+17
June „ . . .	+0'29	-0'23	- 19	-0'7	- 8
July „ . . .	+0'20	+ 1'96	+ 92	-1'6	-19
August „ . . .	+0'12	+ 1'00	+ 55	-1'3	-19
September „ . . .	+0'48	- 0'61	- 39	-1'0	-17

The preceding data indicate that the meteorology of Zanzibar in 1899 was characterized by unusual lightness of the winds from June to September, and increased pressure throughout nearly the whole period from January

to September. The rainfall was in large excess, more especially in April and May. The most important feature in the meteorology of the south-east trades region in the pre-monsoon period, January to May, was the feebleness of the gradients due to decreased pressure at Mauritius and increased pressure at Zanzibar.

The following table gives the mean pressure differences between Mauritius and Zanzibar and Mauritius and the Seychelles (determined from the data of the five years 1894-98) and the actual differences in the corresponding months of the year 1899:—

MONTH.	PRESSURE DIFFERENCE.					
	MAURITIUS MINUS ZANZIBAR.			MAURITIUS MINUS SEYCHELLES.		
	Mean of 1894 to 1898.	Mean of 1899.	Variation.	Mean of 1894 to 1898.	Mean of 1899.	Variation.
January	+ '026	— '003	— '029	+ '017	— '002	— '019
February	— '020	+ '030	+ '050	— '015	+ '002	+ '017
March	+ '050	+ '042	— '008	+ '060	+ '036	— '024
April	+ '057	+ '065	+ '008	+ '106	+ '114	+ '008
May	+ '065	+ '055	+ '010	+ '166	+ '168	+ '002
June	+ '054	+ '043	— 011	+ '221	+ '192	— '029
July	+ '077	+ '130	+ '053	+ '224	+ '276	+ '052
August	+ '105	+ '142	+ '037	+ '240	+ 279	+ '041
September	+ '113	+ '094	— '019	+ '216	+ '199	— '017
Mean of whole period	+ '068	+ '066	— '002	+ '139	+ '140	+ '003
Mean of June to September.	+ '087	+ '102	+ '015	+ '225	+ 237	+ '012

The preceding data establish that the pressure differences or total gradients between Mauritius and the equatorial belt, as represented by the Seychelles, were less than the mean of the five years 1894-98 in the first and last months (June and September) of the south-west monsoon period of 1899, and were slightly greater in July and August.

The following table gives a comparison, week by week, from the 1st of May to the end of September, of the air pressure and velocity of the air movement at Port Victoria, Seychelles, in the five years 1895, 1896, 1897, 1898 and 1899:—

Weekly means of pressure and wind velocity at Port Victoria, Seychelles.

WEEK.	1895.		1896.		1897.		1898.		1899.	
	to A.M. pressure reduced to sea level and constant gravity at Lat. 45°.	Hourly wind velocity in miles.	to A.M. pressure reduced to sea level and constant gravity at Lat. 45°.	Hourly wind velocity in miles.	to A.M. pressure reduced to sea level and constant gravity at Lat. 45°.	Hourly wind velocity in miles.	to A.M. pressure reduced to sea level and constant gravity at Lat. 45°.	Hourly wind velocity in miles.	to A.M. pressure reduced to sea level and constant gravity at Lat. 45°.	Hourly wind velocity in miles.
1st to 7th May	29'899	5'9	29'915	5'3	29'886	7'1	29'863	3'1	29'877	5'7
8th to 14th "	'912	3'6	'917	8'3	'931	6'4	'879	2'4	'880	4'4
15th to 21st May.	'899	3'7	'921	10'1	'906	6'2	'896	7'9	'899	7'5
22nd to 28th May.	'925	6'4	'955	9'4	'875	6'9	'901	7'5	'947	10'5
29th May to 4th June.	'895	9'9	'923	9'4	'852	4'5	'845	7'5	'927	10'9
5th to 11th June.	'863	12'9	'913	9'5	'864	7'3	'874	10'8	'947	8'3
12th to 18th June.	'886	11'6	'876	11'8	'916	7'8	'921	13'7	'966	12'2
19th to 25th June.	'976	10'3	'951	9'9	'934	9'0	'928	10'3	'949	13'5
26th June to 2nd July.	'989	13'0	'945	10'7	'941	4'0	'955	13'0	'972	11'7
3rd to 9th July.	30'001	9'7	'963	12'6	'942	11'3	'919	13'9	'987	15'9
10th to 16th July.	29'970	11'3	'990	11'9	'914	10'0	'913	12'2	'995	14'8
17th to 23rd July.	30'005	14'0	30'048	12'6	'906	9'2	'925	8'9	'965	13'3
24th to 30th July.	'003	11'2	29'998	11'3	'902	16'8	'936	11'5	'972	14'8
31st July to 6th August.	29'974	13'2	'949	15'8	'925	11'5	'934	12'4	'962	13'0
7th to 13th Aug. st.	'927	11'7	'953	14'0	'962	9'9	'956	12'3	'947	14'2
14th to 20th August.	'963	16'0	'994	13'7	'945	13'1	'941	14'3	'968	15'3
21st to 27th August.	'973	14'0	30'014	15'5	'926	12'8	'940	12'3	'990	15'8
28th August to 3rd Sept.	'925	12'0	29'957	16'1	'902	8'9	'947	9'9	'968	12'2
4th to 10th September.	'991	13'3	'947	10'8	'965	16'7	'894	13'4	'987	15'0
11th to 17th September.	'987	12'9	'957	13'3	'933	10'9	'898	12'5	30'007	12'8
18th to 24th September.	30'015	12'1	'987	12'8	'940	13'0	'954	10'3	'040	7'5

The hot weather conditions of pressure and temperature were strongly marked in 1899, and the slight delay in the strengthening of the winds at the Seychelles immediately antecedent to the monsoon indicated by the data of the preceding table was not due to conditions in either the Indian land or sea area, and was almost entirely due to conditions outside of India, and probably present in the Indian Ocean.

The data of the preceding four tables indicate that the meteorological conditions in the south-east trades region were abnormal, more especially in the period antecedent to the south-west monsoon and in the month of June. The variations of the actual pressure and of the pressure gradients were not large. It is

noteworthy that the gradients were actually considerably greater than usual in the months of July and August, when the drought and failure of the monsoon in India and Abyssinia was most conspicuous. The known facts of the distribution of rainfall in South Africa and at Zanzibar and the Seychelles suggest that, although the south-east trades were of at least normal strength during the greater part of the monsoon period, they were deflected more largely than usual to South and Central Africa.

These data, more especially those of the last table, appear to indicate that the south-east trade winds were probably below their normal strength in June 1899, and were slightly stronger than usual in July and August.

The following gives the mean direction of the actual and normal air movement at Zanzibar, the Seychelles and in the western half of the Equatorial Belt, and shows that the direction of the air movement in the south-east trades area was very considerably modified :—

MONTH.	ZANZIBAR.		SEYCHELLES.		SHIPS IN WEST EQUATORIAL BELT.	
	Actual.	Variation E.	Actual.	Variation E.	Actual.	Variation E.
January . . .	N 36° E	+ 1°	N 32° W	+ 11°	N 59° E	+ 54°
February . . .	N 43° E	+ 9°	N 13° W	+ 14°	N 10° E	+ 15°
March . . .	S 34° E	0	N 25° E	+ 56°	N 6° E	- 22°
April . . .	S 2° W	- 7°	S 54° E	- 15°	S 72° E	+ 36°
May . . .	S 1° W	- 6°	S 44° E	0	S 39° E	- 1°
June . . .	S 4° E	0	S 22° E	+ 1°	S 26° E	0
July . . .	S 8° E	+ 3°	S 41° E	+ 12°	S 39° E	+ 8°
August . . .	S 8° E	- 1°	S 32° E	- 4°	S 40° E	+ 2°
September . .	S 2° W	- 10°	S 30° E	- 11°	S 4° W	- 39°

The preceding data indicate :—

(1) Much irregularity in the variations of the winds in the north-west of the Indian Ocean from their normal directions during the period January to May.

(2) Increased easting of the winds in the same area in June and July and increased westing (or decreased easting) in September. The mean variations in June, July and August were small in amount.

The preceding discussion has shown abnormal variations of the pressure conditions and the air movement in the south-east trades region, but they appear to be inadequate to explain the remarkable features of the Arabian Sea current as a rain-giving current.

A remarkable feature of the meteorology of the period in India was the pressure variations or anomalies which were closely related to the distribution of rainfall in a very suggestive manner. In the region of increased rainfall in North-Eastern India and Burma, the anomalies were throughout from July to September negative, and in

the drought area in Western and North-Western India they were steadily positive, their amounts being greatest in the area of the greatest intensity of the drought.

The following gives data in illustration :—

PROVINCE OR DIVISION.	PRESSURE ANOMALY.			
	June.	July.	August.	September.
Burma	"	"	"	"
Assam	+ '022	- '040	- '033	- '016
Bengal	+ '004	- '032	- '036	- '023
Orissa	+ '009	- '023	- '028	- '019
Bihar	+ '031	+ '009	- '028	+ '008
Chota Nagpur . . .	- '007	- '026	- '026	- '022
North-Western Provinces and Oudh.	+ '003	- '004	- '009	+ '010
Punjab	- '014	- '017	- '010	- '011
Sind	- '021	- '033	- '010	- '014
Rajputana	- '036	- '006	+ '037	+ '024
Gujarat	- '016	+ '024	+ '047	+ '023
Central India . . .	- '013	+ '046	+ '061	+ '041
Central Provinces .	- '009	+ '022	+ '026	+ '023
Berar	+ '002	+ '031	+ '021	+ '033
West Coast	- '001	+ '048	+ '041	+ '041
Bombay Deccan . .	- '004	+ '034	+ '026	+ '017
Mysore	- '013	+ '041	+ '037	+ '022
Madras Coast . . .	- '012	+ '014	+ '007	- '007
Madras Deccan . .	+ '015	+ '017	- '007	+ '003
South India	+ '001	+ '028	+ '019	- '009
	0	+ '006	- '003	- '010

IV.—The retreating south-west monsoon period October to December 1899.—The following gives mean variation data of this period for eleven meteorological provinces :—

METEOROLOGICAL PROVINCE.	VARIATION FROM NORMAL DURING RETREATING SOUTH-WEST MONSOON SEASON OCTOBER TO DECEMBER.						
	Mean pressure.	Mean maximum temperature.	Mean minimum temperature.	Mean aqueous vapour pressure.	Mean humidity.	Mean cloud amount.	Percentage variation of rainfall from normal.
Burma Coast and Bay Islands.	"	0	0	"	- 4	- 0.3	Inches. -4.51
Burma Inland . .	+ '035	+ 0.2	+ 0.1	- '038	- 4	- 0.3	+ 1.53
Assam	+ '027	- 1.6	- 0.2				+ 0.45
Bengal and Orissa	+ '031	- 1.9	- 1.0				- 9
Gangetic Plain and Chota Nagpur.	+ '031	- 0.1	- 0.9	- '011	- 1	- 0.5	- 0.58
Upper Sub-Himalayas	+ '014	+ 2.8	- 0.3	- '001	- 7	- 0.8	- 2.18
	+ 0.09	+ 3.2	+ 2.2	- '071	- 12	- 0.1	- 0.82

METEOROLOGICAL PROVINCE.	VARIATION FROM NORMAL DURING RETREATING SOUTH-WEST MONSOON SEASON OCTOBER TO DECEMBER.						
	Mean pressure.	Mean maximum temperature.	Mean minimum temperature.	Mean aqueous vapour pressure.	Mean humidity.	Mean cloud amount.	Percentage variation of rainfall from normal.
Indus Valley and North-West Rajputana.	+005	+25	+21	+001	-4	+04	-89
East Rajputana, Central India and Gujarat.	+009	+59	+40	-075	-14	-06	-98
Deccan	+025	+67	+12	-147	-22	-12	-96
West-Coast	+035	+11	-02	-036	-5	-15	-45
South India	+038	+20	-10	-072	-9	-07	-31
Extra-Tropical India.	+017	+21	+10	-031	-8	-03	-56
Tropical India	+032	+17	0	-073	-10	-09	-36
Whole India	+024	+19	+05	-050	-9	-06	-47

The following summarizes the chief features of the period :—

(1) The mean pressure was above the normal over the whole Indian area. It was most largely in excess in South India, the West Coast, Burma, Bengal, Assam and Orissa, and least in excess in North-Western India. In other words, there was a slight excess in Burma, North-Eastern India and the centre and south of the Peninsula, relatively to Central and North-Western India.

(2) The maximum temperature of the period was in excess in all divisions except Burma Inland, Assam and Bengal and Orissa. The excess was large in the Deccan (+6°7) and East Rajputana, Central India and Gujarat (+5°9). The minimum temperature was practically normal or in slight defect except in the Deccan and North-Western and Central India. The excess was greatest in East Rajputana, Central India and Gujarat (+4°0). The mean temperature of the period was above the normal over the whole area except Burma Inland, Assam, Bengal and Orissa, the excess being greatest in the Deccan (+4°0), East Rajputana, Central India and Gujarat (+5°0).

(3) The mean relative and absolute humidities were more or less below the normal over the whole Indian area except the Indus Valley, where the aqueous vapour present in the air was normal in amount. The mean relative humidity was 22 below the normal in the Deccan, 14 below in East Rajputana and Central India, and 12 below in the Upper Sub-Himalayas. The air was hence exceedingly dry in the Deccan, East Rajputana and the Punjab.

(4) The rainfall of the period was in moderate to considerable excess in Upper Burma and Assam and was normal in Bengal. The following gives data in illustration :—

PROVINCE.	RAINFALL DURING THE RETREATING SOUTH-WEST MONSOON PERIOD OCTOBER TO DECEMBER.			
	Average actual.	Average normal.	Variation from normal.	Percentage variation from normal.
Upper Burma	Inches. 8'60	Inches. 5'76	Inches. +2'90	+50
Assam	7'34	5'96	+1'38	+23
Bengal	5'50	5'49	+0'01	0

(5) The rainfall was very scanty in Bihar, Chota Nagpur, the North-Western Provinces, Rajputana, Central India, North Bombay, Berar, the Central Provinces and Deccan, areas which usually receive moderate rain during this period, and was practically *nil* in the greater part of the area :—

AREA.	RAINFALL DURING THE RETREATING SOUTH-WEST MONSOON PERIOD OCTOBER TO DECEMBER.			
	Average actual.	Average normal.	Variation from normal.	Percentage variation from normal.
Bihar	Inch. 0'93	Inches. 3'01	Inches. -2'08	-69
Chota Nagpur	0'83	3'61	-2'78	-77
North-Western Provinces and Oudh.	0'26	1'93	-1'67	-87
Rajputana	0'06	0'58	-0'52	-90
Central India	0'04	2'27	-2'23	-98
Berar	0'02	3'67	-3'65	-99
Central Provinces	0'02	2'76	-2'74	-99
Bombay	0'48	3'59	-3'11	-87
Hyderabad	0'10	4'63	-4'53	-98

(6) The rainfall of the period was also more or less in defect in Malabar, South and Central Madras, Mysore and the Madras coast districts, the deficiency decreasing in percentage amount southwards, as is shown by the following data :—

DIVISION.	RAINFALL.			
	Average actual, October to December.	Average normal, October to December.	Variation from normal.	Percentage variation from normal.
Malabar	Inches. 10'76	Inches. 14'97	Inches. -4'21	-28
Madras East Coast, North	4'97	11'35	-6'38	-56
" " " Central	14'13	21'70	-7'57	-35
" " " South	19'35	22'58	-3'23	-14
" South	12'39	16'17	-3'78	-23
" Central	2'48	8'47	-5'99	-71
Mysore	3'59	8'70	-5'11	-59

The larger features of the meteorology of the period were very marked. The most important was the continued drought over by far the greater part of India including North-Western and Central India, the Central Provinces, Deccan, Kathiawar, Gujarat, Konkan, Khandesh and Hyderabad.

The peculiar character of the monsoon currents of 1899 has been already pointed out.

The monsoon current in the Arabian Sea was very feeble in July, August and September, and withdrew from practically the whole sea area at the end of the latter month. The effect of high temperatures is less powerful than that of local condensation and rainfall in reducing pressure or in maintaining low pressure, and hence pressure was in these months in large and increasing excess over the north and centre of the Arabian Sea and the drought area in India.

This increased pressure in the north and centre of the Peninsula was effective in determining the distribution of the retreating south-west monsoon rains.

The Bay current which was vigorous in June and July gradually fell off in August and was below its normal strength in September. During the greater part of October it was feeble, but continued to be determined northwards to Bengal and Burma rather than westwards to the Madras coast and interior. The storms of the period followed the same course, which was, in fact, marked out for them by the lie of the axis of the low pressure area in the Bay.

The continued rise of pressure in Northern India due to the seasonal changes modified those conditions largely, and the area of low pressure was transferred rapidly in the latter part of October to the south of the Bay, thus determining the feeble residual humid current to the Coromandel coast south of Nellore. The rainfall at this stage was comparatively limited, chiefly in consequence of the feebleness of the retreating current, and was hence practically restricted to South Madras and the Coromandel coast districts. A disturbance or storm gave a moderate burst of rain in the coast districts of South Madras in the second week of December. The Bay monsoon current withdrew early in December, and the subsequent rain in Southern India, due to the local north-east winds, was less than usual.

The chief feature of the distribution of pressure during this period was hence the considerable excess of pressure in the Peninsula. This feature became more prominent with the advance of the season.

The following table gives the pressure anomalies of the eleven meteorological provinces of India for the months of September, October, November and December. It illustrates the large excess of pressure in the Peninsula:—

METEOROLOGICAL PROVINCE.	PRESSURE ANOMALY.					
	Sep-tember.	October.	Novem-ber.	Decem-ber.	Mean of period Octo-ber to Decem-ber.	Mean of period Novem-ber and Decem-ber.
Burma Coast and Bay Islands.	—'018	+ '010	+ '017	+ '008	+ '012	+ '013
Burma Inland . . .	—'011	+ '017	—'019	+ '012	+ '003	—'004
Assam	— 023	+ '019	+ '006	—'003	+ '007	+ '002
Bengal and Orissa . .	—'014	+ '015	+ '008	0	+ '008	+ '004
Gangetic Plain and Chota Nagpur.	—'008	+ '005	—'014	—'018	—'009	—'016
Upper Sub-Himalayas .	—'014	0	—'024	—'020	—'015	—'022
Indus Valley and North-West Rajputana.	0	+ '001	—'029	—'028	—'019	—'029
East Rajputana, Central India and Gujarat.	+ '022	—'016	—'018	—'010	—'015	—'014
Deccan	+ '028	—'003	—'010	+ '009	+ '002	+ '004
West Coast	+ '017	—'016	+ '032	+ '019	+ '012	+ '026
South India	—'002	—'011	+ '031	+ '025	+ '015	+ '028

The data of the preceding table show a marked tendency to local excess of pressure in the Peninsula during the whole period September to December. It was most marked in the Deccan in September, when the monsoon currents were withdrawing from North-Eastern India, and was transferred slowly southwards to Southern India during the remainder of the period.

The distribution of the rainfall of this period in the Peninsula was opposite in general character to that of the corresponding periods of the years 1896 and 1897.

The pressure conditions of the period were favourable to the determination of the retreating south-west monsoon to the South Madras coast districts and Southern India, whilst they were unfavourable to their diversion to the Deccan and North Madras. They were favourable in Burma, and more especially in Upper Burma. The rains continued until the second week of November in Burma.

The following table shows the character of the rainfall distribution during this period in the Peninsula:—

DIVISION.	RAINFALL OF PERIOD OCTOBER TO DECEMBER.			
	Average actual.	Average normal.	Variation from normal.	Percentage variation from normal.
	Inches.	Inches.	Inches.	
Malaba. Coast	10'76	14'97	—4'21	—25
Mysore	3'59	8'70	—5'11	—59
Madras (South Central) .	5'40	10'99	—5'59	—51
„ (East Coast, North) .	4'97	11'35	—6'38	—56
„ (Central)	2'48	8'47	—5'99	—71
„ (East Coast, Central) .	14'13	21'70	—7'57	—35
„ („ „ South) . .	19'35	22'58	—3'23	—14
„ (South)	12'39	16'17	—3'78	—23

The three following tables give the variations of temperature, humidity, cloud, rainfall and air movement from the normal in the areas of excessive temperature in October, November and December 1899:—

October.

AREA.	VARIATION FROM NORMAL OF								
	Mean maximum temperature.	Mean minimum temperature.	Mean temperature.	Mean aqueous vapour pressure.	Mean relative humidity.	Mean cloud amount.	Rainfall.	Mean wind velocity expressed as a percentage.	Mean wind steadiness.
	°	°	°	"			Inches.		
Central India . . .	+7.5	+1.3	+4.4				-1.55		
Rajputana . . .	+4.7	+2.7	+3.7	-152	-19	-0.8	-0.20	+22	+5
Berar . . .	+10.0	+2.8	+6.4	-256	-34	-1.0	-2.47	+27	+6
Central Provinces .	+7.0	-0.4	+3.3	-198	-27	-1.1	-1.48	+19	-5
Bombay Deccan . .	+8.3	+1.6	+5.0	-101	-15	-1.7	-4.02	+19	+13
Hyderabad . . .	+6.8	+1.8	+4.3	-138	-21	-1.4	-2.81	-10	+25

November.

AREA.	VARIATION FROM NORMAL OF								
	Mean maximum temperature.	Mean minimum temperature.	Mean temperature.	Mean aqueous vapour pressure.	Mean relative humidity.	Mean cloud amount.	Rainfall.	Mean wind velocity expressed as a percentage.	Mean wind steadiness.
	°	°	°	"			Inches.		
Central India . . .	+6.8	+2.7	+4.8				-0.33		
Rajputana . . .	+4.6	+6.0	+5.3	-047	-12	-0.9	-0.16	+4	-17
Berar . . .	+9.0	+1.4	+5.2	-198	-30	-1.4	-0.64	-8	-18
Central Provinces .	+7.2	+0.8	+4.0	-146	-24	-1.5	-0.38	+8	-39
Bombay Deccan . .	+7.0	-0.3	+3.4	-148	-16	-2.2	-1.44	-1	-7
Hyderabad . . .	+6.8	+0.1	+3.5	-147	-21	-1.9	-1.20	-19	-7

December.

AREA.	VARIATION FROM NORMAL OF								
	Mean maximum temperature.	Mean minimum temperature.	Mean temperature.	Mean aqueous vapour pressure.	Mean relative humidity.	Mean cloud amount.	Rainfall.	Mean wind velocity expressed as a percentage.	Mean wind steadiness.
	°	°	°	"			Inch.		
Central India . . .	+5.6	+3.8	+4.7				-0.35		
Rajputana . . .	+4.9	+5.4	+5.2	-026	-10	-0.1	-0.16	+3	-7
Berar . . .	+8.2	+4.0	+6.1	-110	-23	+0.1	-0.54	+1	-5
Central Provinces .	+6.3	+3.4	+4.9	-092	-20	0	-0.38	+16	-14
Bombay Deccan . .	+4.6	+1.1	+2.9	-132	-16	-1.2	-0.41	+17	+10
Hyderabad . . .	+4.5	+0.9	+2.7	-107	-17	-1.1	-0.52	-8	-13

The most remarkable feature of the period in this large area of excessive temperature was the extreme and abnormal unsteadiness of the winds. This is shown by the following data for all second class stations in the area:—

STATION OR PROVINCE.	WIND STEADINESS.					
	October.		November.		December.	
	Actual.	Variation from normal.	Actual.	Variation from normal.	Actual.	Variation from normal.
Deesa . . .	20	+8	30	-18	18	-32
Nagpur . . .	52	+3	30	-30	43	-11
Khandwa . . .	21	-14	3	-49	24	-18
Akola . . .	51	+19	44	-5	50	-7
Buldana . . .	42	-7	22	-30	39	-4
Hyderabad (Deccan) .	58	+25	60	-7	52	-13
Poona . . .	18	-1	45	-15	60	+6
Belgaum . . .	24	+11	49	-15	81	+14
Deccan . . .	39	+19	57	-5	72	+8
Berar . . .	47	+6	33	-18	45	-5
Central Provinces, West	37	-5	17	-39	34	-14

The data show that this feature of abnormal unsteadiness of the winds was most strongly exhibited in the month of November, when the day temperature was, on the whole, most largely in excess.

Winds differed very irregularly in strength from the mean of the period, but were on the average of all stations slightly feebler than usual, as is shown below:—

STATION.	WIND VELOCITY IN MILES PER DIEM.					
	November.			December.		
	Actual.	Normal.	Percentage variation from normal.	Actual.	Normal.	Percentage variation from normal.
Jubbulpore . . .	31	43	-28	31	43	-28
Raipur . . .	34	79	-57	31	62	-50
Nagpur . . .	101	95	+6	98	83	+18
Khandwa . . .	75	64	+17	79	62	+27
Akola . . .	84	85	-1	95	80	+19
Buldana . . .	108	122	-11	118	132	-11
Hyderabad . . .	69	88	-22	73	81	-10
Mean of all stations .	71	81	-12	75	78	-4

The previous data have shown clearly the chief features

of the meteorological conditions of the period accompanying the large excess of temperature, which was a prominent feature of the meteorology of the period. These were—

1st.—The prevalence of light and extremely unsteady winds.

2nd.—Large deficiency in the amount of aqueous vapour present in the air, and also as shown by the daily observations rapid changes in the humidity, accompanying shifts of wind from westerly to easterly direction and *vice versa*.

3rd.—Large deficiency in the amount of cloud, hence favouring largely increased temperature by day and more rapid reduction of temperature by night than usual.

A further explanation of the conditions accompanying these phases of excessive temperature in Berar and the Central Provinces will be found in page 792 of the Annual Summary for 1898.

The year.—The following gives a tabular summary of the meteorological data of the year 1899 for the eleven meteorological provinces of India:—

Provincial meteorological data for the year.

PROVINCE.	Bar. variation.	Mean maximum temperature of year.	Variation of year.	Mean minimum temperature of year.	Variation of year.	Mean daily temperature of year.	Variation of year.	Mean daily range.	Absolute range during year.	Mean monthly absolute range.	Rainfall of year.	Normal rainfall of year.	Variation from normal of year.	Percentage variation of rainfall.
	"	°	°	°	°	°	°	°	°	°	Inches.	Inches.	Inches.	—
Burma Coast and Bay Islands.	−002	87.8	+0.1	73.6	+0.9	80.8	+0.7	14.2	36.5	22.4	132.22	139.52	−2.84	−2
Burma Inland . . .	+005	89.5	−0.7	69.0	+0.4	79.3	−0.2	20.5	60.4	31.4	55.45	46.55	+8.90	+19
Assam	−002	82.5	−1.0	66.6	−0.6	74.6	−0.8	15.9	56.2	27.6	110.38	104.92	+5.47	+5
Bengal and Orissa . .	−001	86.8	0	69.7	0	78.3	0	17.1	59.8	29.1	79.61	72.09	+7.52	+10
Gangetic Plain and Chota Nagpur.	−003	88.4	+0.5	66.7	0	77.6	+0.2	21.7	70.3	34.8	51.42	44.79	+6.63	+15
Upper Sub-Himalayas .	−005	89.5	+2.1	64.4	+1.5	77.0	+1.8	25.3	77.6	40.8	18.74	37.82	−18.32	−48
Indus Valley and North-West Rajputana .	−007	93.3	+2.1	66.2	+1.1	79.7	+1.6	27.1	83.7	42.4	2.79	9.66	−6.87	−71
East Rajputana, Central India and Gujarat.	+007	92.8	+2.9	68.2	+1.7	80.5	+2.2	24.6	71.3	38.0	13.20	3.12	−16.22	−34
Deccan	+015	92.4	+2.6	67.6	+0.6	80.0	+1.6	24.8	66.4	37.4	19.65	41.39	−21.62	−52
West Coast	+016	86.3	+0.5	74.0	+0.1	80.2	+0.3	12.2	32.5	19.4	69.32	103.13	−33.81	−33
South India	+011	90.2	+1.0	71.2	+0.1	80.7	+0.6	19.0	45.0	29.0	30.65	40.58	−9.93	−24
Mean of whole India from Table I.	+003	89.0	+0.9	68.8	+0.5	79.0	+0.7	20.2	60.0	32.0	53.04	60.96	−7.37	−12
Mean of whole India from Table II.	+004	89.5	+1.4	68.4	+0.1	78.1	+0.8	21.1	59.9					

The mean 8 A.M. pressure of the year over the whole of India was practically normal. It was in very slight defect in Northern India, in slight excess in the Peninsula, the excess being greatest in the West Coast (+0.16") and the Deccan (+0.15").

The mean maximum temperature was in excess in all provinces except Burma Inland and Assam, where it was 1° below the normal, and Bengal, where it was normal. The excess averaged 0°.9 for the whole of India, and was greatest in East Rajputana, Central India and Gujarat (+2°). It exceeded 2° in the Deccan (+2°6), the Indus Valley and North-West Rajputana and Upper Sub-Himalayas, each (+2°1). The mean minimum or night temperature was also in general excess. The excess was less than that in the day temperature and exceeded 1° only in East Rajputana, Central India and Gujarat (+1°7), Upper Sub-Himalayas (+1°5) and Indus Valley and North-West

Rajputana (+1°1)—The mean temperature of the whole land area was, according to the data of Table I, 0°7 above the normal and according to those of Table II 0°8 in excess. The variations for the year were less than 1° in seven out of the eleven meteorological provinces. The mean temperature of the year was 2°2 in excess in East Rajputana, Central India and Gujarat, 1°8 in the Upper Sub-Himalayas and 1°6 in the Deccan, Indus Valley and North-West Rajputana.

The mean rainfall for the whole of India was in slight defect in the first division of the year, in considerable defect in the fourth and in very large defect in the third. It was, on the other hand, in slight excess in the second or hot weather period. The mean variation for the whole year (taking into consideration the areas represented by the rainfall stations) was −11.14 inches. The deficiency exceeded 50 per cent. in the Indus Valley and West

Rajputana (71 per cent.), East Rajputana (54 per cent.) and the Deccan (52 per cent.). The rainfall of the year was very largely in defect over the whole area which usually receives its monsoon rainfall from the Arabian Sea current and in moderate to largish excess over North-Eastern India and Burma. It was between 20 and 71 per cent. below the normal in six meteorological provinces.

The following gives a comparison of the actual mean rainfall of India with the normal mean for each year from 1875 to 1899, determined by Mr. Blanford's method :—

YEAR.	Mean actual rainfall.	Variation from normal.	Percentage variation from normal.
	Inches.	Inches.	
1875	43'47	+2'38	+ 6
1876	36'60	-4'49	-11
1877	36'81	-4'28	-10
1878	47'43	+6'34	+15
1879	42'78	+1'69	+ 4
1880	39'53	-1'56	- 4
1881	41'19	+0'10	0
1882	43'73	+2'64	+ 6
1883	40'97	-0'12	0
1884	42'82	+1'73	+ 4
1885	42'14	+1'05	+ 3
1886	44'11	+3'02	+ 7
1887	43'51	+2'42	+ 6
1888	39'55	-1'54	- 4
1889	43'50	+2'41	+ 6
1890	41'77	+0'68	+ 2
1891	37'55	-3'54	- 9
1892	46'18	+5'09	+12
1893	50'16	+9'07	+22
1894	47'56	+6'47	+16
1895	38'90	-2'90	- 7
1896	36'26	-4'83	-12
1897	40'94	-0'15	0
1898	41'52	+0'43	+ 1
1899	29'95	-11'14	-27

The preceding table shows that the precipitation of the year was 11'14 inches or 27 per cent. in defect of the normal, by far the largest deficiency which has occurred since the commencement of systematic meteorological observation in India.

Concluding Remarks.—All the more important features of the meteorology of the year have been stated in the preceding discussion. The following gives a very

brief summary of the more interesting and important abnormal features with their probable relations to each other.

The chief feature of the cold weather was the absence of well-marked cyclonic storms and the consequent scanty precipitation of the period in North-Western and Central India. This was, as in four out of the five preceding cold weather periods, a phase of a more general partial failure of the winter rains and snowfall over the large area including Baluchistan, Afghanistan, Persia, Arabia and Asiatic Turkey. It would be interesting to trace fully the relations and conditions accompanying and determining very deficient precipitation during the whole winter or cold weather period from October to March over that large area, but materials are not as yet available for this general discussion.

As is almost invariably the rule, the scanty precipitation of the cold weather accompanied higher temperature and greater dryness of the air in that period, and was followed by more pronounced and exaggerated hot weather conditions than usual. Similar conditions obtained in the years—1879, 1880, 1882, 1890, 1892, 1895, 1896, 1897 and 1898, in all of which the winter rains failed more or less in Western India. Temperature was in large excess in March and May 1899, the air unusually dry, and the skies more free from cloud than usual.

The following gives a comparison of the variations of temperature, humidity and rainfall for the hot weather periods of these years :—

YEAR.	MEAN VARIATION DURING HOT WEATHER IN EXTRA-TROPICAL INDIA OF			
	Temperature.	Humidity.	Rainfall.	Percentage variation from normal.
	°		Inches.	
1879	+1'9	-6	-1'17	-22
1880	+1'9	-1	-0'62	-11
1882	+0'1	-3	-0'35	- 7
1890	+0'7	-1	-0'60	-12
1892	+3'1	-5	-0'37	- 8
1895	+0'6	+1	-0'64	-13
1896	+2'3	-6	-1'01	-21
1897	+0'3	-2	-0'30	- 7
1898	+1'5	-5	-1'53	-33
1899	+1'3	-1	+0'44	+10

The character and distribution of the cold weather precipitation can be usually foretold in the beginning of December from the meteorological conditions of the months of October and November and the general character of the previous south-west monsoon rains. The more important principles or rules have been stated in

the memoir on the "Cold Weather Storms of Northern India". The forecast of the cold weather precipitation of 1898-99 was in approximate accordance with facts and hence a confirmation of the theory upon which these forecasts are based.

In hot weather seasons following cold weather periods in which the precipitation in North-Western India has been scanty and below the normal, there frequently occurs heavier rain than usual in North and East Bengal and Assam. There is also very occasionally a very general burst of rain due to a widely spread disturbance giving rise to numerous and prolonged series of thunderstorms.

The years 1879, 1880, 1881, 1882, 1890, 1892, 1895, 1896, 1897 and 1898, were all characterized by scanty winter precipitation and more intense hot weather than usual. The following gives the percentage variation of rainfall from the normal in the hot weather seasons of these years in Assam and Bengal:—

YEAR.	ASSAM.	EAST BENGAL.	NORTH BENGAL.	SOUTH-WEST BENGAL.
	Percentage variation of hot weather rainfall from normal.	Percentage variation of hot weather rainfall from normal.	Percentage variation of hot weather rainfall from normal.	Percentage variation of hot weather rainfall from normal.
1879 . .	— 3	—55	—10	—68
1880 . .	—38	+15	+ 7	+ 6
1881 . .	+16	+72	+30	+31
1882 . .	— 4	+ 2	—21	— 8
1890 . .	—15	+ 1	—10	—23
1892 . .	+53	+16	+52	—22
1895 . .	— 4	+19	— 6	—17
1896 . .	+ 9	— 2	+11	—29
1897 . .	— 6	—22	+ 5	— 6
1898 . .	—51	—43	—20	—30
1899 . .	— 1	+29	—10	+ 5

The increased rainfall in North and East Bengal and Cachar is evidently a result of the greater intensity of the hot weather conditions. The increasing heat in the interior in March and April accompanies an increasing indraught from the north of the Bay into Bengal, the intensity of which depends upon the intensity of the hot weather conditions in the interior. In the hot weather of 1899 this indraught of moist humid winds was more vigorous than usual and the forced ascent of these winds caused by the hills and mountain ranges of East Bengal and Assam gave rise to unusually frequent series of thunderstorms and nor'-westers and very heavy thunder-showers.

The second feature of a heavy general burst of rainfall

over nearly the whole of India for a short period during hot weathers following dry cold weathers was very marked in April 1890 and May 1886.

The cause of this rainfall is similar to that of the increased rainfall in Bengal. The abnormal intensity of the hot weather conditions gives rise to a vigorous indraught from the neighbouring Indian Seas. The various actions connected with this occasionally lead to a period of very general disturbance characterized by numerous thunderstorms over much larger areas than usual.

The meteorology of the south-west monsoon period of 1899 is of exceptional interest on account of the remarkable failure of the Bombay monsoon as a rain-giving current, the consequent drought causing the most severe famine of the past 200 years at least.

The conditions in India were undoubtedly favourable to a normal monsoon as a cold weather of scanty snowfall had been followed by a hot weather of greater intensity than usual. There were no abnormal pressure features likely to affect to any large extent the distribution of the rainfall.

The monsoon currents advanced about the normal time and in the manner anticipated in the forecast and extended rapidly into the interior and gave unusually favourable and abundant rain over nearly the whole of North-Western India in June. A rapid change occurred in the last week of the month which completely transformed the character of the Arabian Sea current as a rain-giving current.

During the remainder of the season it gave practically no rain to the northern parts of the area usually depending on it, including Kathiawar, Gujarat, Rajputana West, Central India West, Berar, Khandesh and the Central Provinces West, and only light occasional showers of little agricultural value in the Deccan and Konkan.

The winds on the Konkan coast were considerably weaker than usual (about 20 per cent.) and were slightly weaker in the Arabian Sea. But neither in strength, nor in direction were they modified to such an extent as to explain the variation in the current from its normal character as a rain-distributing current.

The available data indicate that the abnormal character of the Arabian Sea monsoon current was due to the unusual determination of the south-east trades current to South-East and Central Africa. This is shown:—

(1) By the abnormal rainfall in South Africa from May to August.

(2) By the increased easting of the winds in the western half of the south-east trades region and more especially in the equatorial belt during July and August.

The following extract from a letter received from Mr. Hutchins, Conservator of Forests, Cape Colony, shows clearly the abnormally heavy and untimely rainfall in South Africa from May to August, *i.e.*, during south-

west monsoon period when fine clear dry cool weather as a rule prevails continuously in that area :—

"The first part of the south-east rains this year (1899) were weak or normal, but in February, that is to say, when they were about at their maximum for the season, heavy general rain occurred. The rains were more heavy and more general than have been known for some years past, in fact the drought which has prevailed more or less over the whole area of south-east rainfall in South Africa for several years past, has now completely broken up. Then at the end of February followed weather such as is believed not to have occurred for at least a quarter of a century. The heavy rains of February continued at intervals during the remainder of summer and autumn (end of June) and apparently set up conditions which have brought thunderstorms and winter rains to immense tracts, where for many years past only summer rains have prevailed. Normally the Karoo, the Free State and the Transvaal are watered almost exclusively by summer rains. This year winter rains have prevailed right through the Karoo, across the Orange River and far into the Kalaharu Desert."

The data given in page 798 show the easterly deviation of the winds at Zanzibar and the Seychelles. It was shown more clearly by the data of the logs of ships in the western half of the equatorial belt.

There hence appear to have been an undue determination of the south-east trades westwards to the whole of South and East Africa, south of the equator. This determination, so far as can be judged, only slightly modified the flow from the Indian Ocean across the eastern half of the equatorial belt into the Bay of Bengal and that portion of the south-west monsoon current hence differed little in character from the normal. The flow across the western half of the equatorial belt was, on the other hand, much less than usual. Consequently the air current over the Arabian Sea from July to September was chiefly local in character and origin, consisting of a flow from the Arabian Sea to India determined by the pressure conditions in these two areas and increased and supplemented by a diminished flow across the western half of the equatorial belt. The gradients over these areas were somewhat less than usual but were remarkably steady during the period and hence the air movement in the Arabian Sea and Western India although not so strong as usual, was unusually steady. The monsoon currents in these two areas therefore depended for their stores of aqueous vapour and hence for their rain-giving capacity chiefly on local evaporation over the Arabian Sea and to a very much less extent than usual upon the supplies brought across the equator into the Arabian Sea from the south-east trades region.

The data discussed above have shown that the air movement in the western half of the equatorial belt differed chiefly in direction and not in strength from that which usually obtains. It is probable that the monsoon flow was local rather than general in character and of oceanic origin and hence that the monsoon currents in the Arabian Sea

and Western India would be of less elevation than usual. Mr. Blanford has made in his "Vade Mecum" an approximate calculation of the normal height of the monsoon current in India. I purpose shortly to apply this or some similar method to the calculation of the height of the monsoon current in India in 1899 and of previous years and thus ascertain whether there are any variations from year to year in this factor which will help to explain some of the peculiarities of the south-west monsoons of the past eight or nine years.

The preceding remarks have suggested the only explanation I can give as to the remarkable failure of the Arabian Sea monsoon current as a rain distributing current from July to September 1899. The marine data indicate that there was no heavy rainfall at sea throughout the season and that the current was as abnormal in its dryness and comparative absence of cloud over the Arabian Sea as in Western India. *The available data indicate that this was due to the larger determination of the south-east trades winds to South-East Africa and the consequent small volume of the air movement from the south-east trades region to the Arabian Sea. The air movement over that area was hence chiefly of local origin and its supplies of aqueous vapour chiefly due, not to influx from the Indian Ocean, but to the small and limited evaporation in the Arabian Sea. It is also probable that the current over the Arabian Sea was of much less elevation than usual.*

This is confirmed by the almost complete failure of the rains over the greater part of the area dependent on the Bombay current after the first burst of monsoon winds into Western India had exhausted itself. It is further confirmed by the remarkable absence of stormy cyclonic weather in the Arabian Sea during the whole monsoon period.

The effect of the drought conditions on pressure was noteworthy. The large decrease of pressure in India from February or March to April was undoubtedly a direct thermal action—a result of the air movements set up by the increasing heat of the interior of India. This effect reached its maximum as usual in the latter part of May or the beginning of June. The low pressure established in that period antecedent to the south-west monsoon in normal years continues with little change until the latter part of August or the beginning of September, during which period temperature over by far the greater part of India is very uniform and little above the temperature of the adjacent seas. The low pressure in India during that period is chiefly maintained by actions accompanying the general monsoon rainfall over India. The release of energy during condensation preceding and accompanying rainfall is vigorous and rapid. Hence it might be anticipated that the diminution of pressure due to this action,

an indirect result of solar radiation, would be greater than that due to the direct action of solar radiation and abnormal heat and drought in India. Hence in such a season as the south-west monsoon of 1899 there would be an excess of pressure relatively to the normal on the mean of the Indian area and this excess of pressure would be greatest in the regions in which the drought was most severe. The following data, a summary of the data in Table I, will illustrate this:—

PROVINCE.	Mean variation from normal July to September 1899.	Mean variation of year 1899.
Punjab	—'004	—'007
North-Western Provinces	+ '002	—'006
Bihar	— '013	—'006
Chota-Nagpur	+ '014	+ '004
Bengal	—'008	—'002
Burma	—'015	0
Sind	+ '032	+ '002
Rajputana	+ '046	+ '007
Gujarat	+ '064	+ '011
Central India	+ '039	+ '008
Central Provinces	+ '043	+ '015
Berar	+ '055	+ '026
Deccan	+ '041	+ '015
Bombay Coast	+ '041	+ '016
Madras Coast	+ '019	+ '013

Whether this excess of pressure was due to and represented an actual excess in the amount or mass of air over the drought areas or whether it represented and was due to a smaller upward movement than usual or to an actual downward movement cannot be fully proved. It was, however, almost certainly not the latter as the excess was as marked in the hot drought areas of large excess of temperature in Western India as in the centre and north of the Arabian Sea, where the chief result of the decreased cloud was undoubtedly increased evaporation and not higher temperature. It is, on the whole, most probable that the increased pressure was in part due to increased mass of air over the drought area and in part to diminished vertical movement or uptake. The abnormal pressure features in the Arabian Sea and Western India, however, appear to me to be one of the results or consequences of the abnormal character of the monsoon currents and of the consequent drought and not to be a cause and still less the chief cause of either. Mr. Dallas in his memoir "On the Failure of the South-West Monsoon Rains in 1899" has worked out fully the abnormal pressure conditions in the Arabian Sea and Western India, and it appears to me

that these are only what might be expected as a consequence of the abnormal determination of the south-east trades to South-East Africa and of the consequent drought in Western India, but that they throw little or no light on the failure of the south-east trades to feed into the south-west monsoon currents of the Arabian Sea and to give them their special abnormal characteristics as rain distributing currents last year.

The effect of these abnormal pressure conditions on the storm tracks of the period was striking. The tendency of the storms of the rains which form in the north-west of the Bay or in Bengal to move westwards along the trough of low pressure, has been frequently pointed out in these annual summaries. In consequence of the excess of pressure in North-Western and Western India, the trough of low pressure ran in a north-west to north direction generally from the Orissa Coast from July to September and hence most of the storms of the period followed a much more northerly course than usual and in some cases, after advancing along the usual west-north-west track through the eastern districts of the Central Provinces, recurved very rapidly to north and passed into Bihar and the eastern districts of the North-Western Provinces. A comparison of the storm track chart of the year (Plate VI) with those for the past two years will show at once this noteworthy feature of the meteorology of the year.

The abnormal character of the air movement in the south-east trades and south-west monsoon region explains fully the drought in North-Western India and Western India and the accompanying meteorological conditions of increased pressure, abnormally high temperature, diminished aqueous vapour pressure, and humidity and amount of cloud during the period July to September 1899.

The Bay current was of normal strength and character in June and contributed towards the general and abundant rainfall of that month in Northern India. This was of course due to the generally favourable pressure and other conditions in North-Western India. The establishment of increased pressure due to absence of rain in North-Western and Western India in the next three months determined the Bay current chiefly to North-Eastern India and Burma. Rainfall was very abundant in July in these areas and was in general excess. The area of excess was smaller in extent in August and was restricted to Assam, East and North Bengal, North Bihar and Burma in September.

The data hence indicate that the Bay current fell off more rapidly in strength than is usually the case in August and was feebler than usual in September.

North-Eastern India and Burma, on the whole, received favourable rain in October, chiefly due to the determination of the storms of the period northwards instead of

westwards, a result or effect of the excess of pressure in the Deccan and North-Western India in modifying the tracks of storms similar to the corresponding effect during the months of July, August and September already referred to as determining or modifying the set of the monsoon currents to Burma and East Bengal.

The weakness of the retreating monsoon current was further shown by its early withdrawal in November from the Bay.

The meteorology of the period from October to December was hence determined chiefly by

- (1) The weakness of the retreating south-west monsoon current in the Bay.
- (2) Its early withdrawal from the Bay.
- (3) Its determination in October chiefly to Burma and Bengal and in November to Burma, Assam and South India (the result of the abnormal pressure conditions).

The rains of the retreating south-west monsoon hence almost completely failed over the greater part of the Peninsula including Berar, the Central Provinces, Hyderabad and the Bombay and Madras Deccan—thus intensifying the drought which had prevailed in these areas during the previous three months.

Bengal and Burma, on the other hand, received favourable rain and the season in Upper Burma was the most favourable since its conquest. Southern India (chiefly the coast districts) obtained moderately abundant rain. Over nearly the whole of the interior of India including North-

Western and Central India and the North Deccan the period was remarkably dry, skies exceptionally free from cloud and rainfall *nil*.

The most noteworthy feature of this period was the extraordinarily high temperature which prevailed in November and December in a broad belt of country stretching across the head of the Peninsula and including North Bombay, Khandesh, Berar, the Central Provinces and Central India. The westerly winds in North-Eastern India were weaker than usual during the period, whilst the prevailing easterly winds in the Deccan were stronger than the normal. The intermediate belt formed an area of light variable winds and calms. Frequent shifts of wind between east and west occurred accompanied with large changes in the amount of aqueous vapour pressure in the air and also in the amount of cloud. The combination of these conditions, *vis.*, (1) the prevalence of light variable winds alternating between west and east, (2) large changes of the amount of aqueous vapour present in the air and great deficiency in the amount of aqueous vapour, (3) small and deficient cloud which favoured unusually and abnormally high day temperature and to a considerably less degree higher night temperature than usual. These conditions were very marked during the whole period. Similar phases of excessive temperature occurred in the months of November and December in the years 1898, 1896, 1890 and 1877 and the conditions were similar in these years to those prevailing in the hot period in 1899.

Appendix.

The following is a brief statement of the hailstorms which occurred during the year 1899 in the provinces of Sind, the Punjab, the North-Western Provinces, the Central Provinces, Assam and Bombay, the reports of which were received too late to be given in the storm sections in the Monthly Weather Reviews of the year:—

DATE.	Area affected by storm.	Hour of occurrence.	Duration of storm.	Direction from which it came.	Size or weight of largest stones.	Character of storm.	Estimate of damage caused by storm.
1899.	SIND.						
4th May.	Sehwan and Dadus Talukas.	About sunset.	15 minutes.	W	Half an inch in diameter.	Moderately severe.	No damage.
	PUNJAB.						
13th Mar.	224 square miles in the Gujarat and Phalia tahsils of the Gujarat district.			E		Moderately severe.	Damaged the crops slightly in 26 villages.
	N.-W. P.						
13th Apl.	About 5 miles in Garhwal district.		1½ hours.	SW	Walnut.	Moderately severe.	Somewhat damage to standing crops. A large number of persons injured severely, of whom seventeen died of their injuries.
	CENTRAL PROVINCES.						
6th Feb.	304 square miles in the Seoni district.			SW		Feeble.	Not much damage.
7th "	730 square miles in the Lakhnadon Tahsil of the Seoni district.		30 minutes.	W	Ber fruit.	Moderately severe.	Damaged crops more or less in 39 villages.
10th "	240 square miles in the Khorai and Saugor Tahsils in the Saugor district.	5-30 P.M.	30 minutes.	NW	Small mangoes.	Severe.	Destroyed crops over about 10,000 acres. Two boys were killed.
10th "	About 112 square miles in the Sohagpur Tahsil of the Hoshangabad district.		2 hours.	W		Moderate.	No severe damage caused.
22nd Apl.	125 square miles in the Sohagpur Tahsil of the Hoshangabad district.	5 P.M.	1 hour.	W	Grain.	Feeble.	Damaged fruit trees slightly.

DATE.	Area affected by storm.	Hour of occurrence.	Duration of storm.	Direction from which it came.	Size or weight of largest stones.	Character of storm.	Estimate of damage caused by storm.
1899.	ASSAM.						
25th Feb.	About 2 square miles in the Sylhet district.		10 minutes.	NW	About 2 tolas.	Severe.	No damage.
4th Mar.	About 2 square miles in the Sylhet district.		About 15 minutes.	NW	About 3 tolas.	Slight.	Mustard and paddy crops damaged very slightly.
8th "	About 4 square miles in the Sylhet district.		About 4 minutes.	S	About a chhat-tak.	Slight.	
9th "	About 3 square miles in the Karimganj sub-district of the Sylhet district.		2 or 3 minutes.	NE	Small.	Slight.	No damage.
9th "	About 2 miles in the Sylhet district.		2 or 3 minutes.	NW	Small.	Slight.	No damage.
9th "	Almost throughout the jurisdiction of Motiganj in the South Sylhet sub-division.		20 minutes.	N	Round and oval, weighing about 2 tolas.	Moderate.	Bora paddy, chilly and linseed crops damaged.
10th "	About 4 square miles in the Sylhet district.		7 or 8 minutes.	W	Big.	Moderate.	Tea leaves, linseed, etc., damaged somewhat.
10th "	About 4 miles in the Sylhet district.		5 or 6 minutes.	NW	Small.	Moderate.	Vegetable damaged a little.
10th "	Karimganj P. S. of the Sylhet district.		5 or 6 minutes.	NW	Small.	Slight.	No damage.
27th "	Throughout the jurisdiction of Maubi Bazar in the South Sylhet sub-division.		15 minutes.	W	Round.	Slight.	No damage.
27th "	Throughout the jurisdiction of Hingajya in the South Sylhet sub-division.		10 or 12 minutes.	NW	Round, weighing about 2 or 3 tolas.	Slight.	No damage.
27th "	39 square miles in the Habiganj sub-district.		15 minutes.	N	Potatoe?	Slight.	Bora crop damaged slightly.
6th April	About 4 square miles in the Sylhet district.		10 to 12 minutes.	NW	½ a tola.	Severe?	Vegetables damaged slightly.

DATE. Day, month and year.	Area affected by storm.	Hour of occurrence.	Duration of storm.	Direction from which it came.	Size or weight of largest stones.	Charac- ter of storm.	Estimate of damage caused by storm.	DATE. Day, month and year.	Area affected by storm.	Hour of occurrence.	Duration of storm.	Direction from which it came.	Size or weight of largest stones.	Charac- ter of storm.	Estimate of damage caused by storm.
1899								1899.	BOMBAY. DHARWAR DIS- TRICT.						
April	One mile in the sub-district of North Sylhet.		15 minutes.	NW	1 a tola.	Slight.	No damage.	28th Mar.	Hubli-Gadag Road.		5 mts.	SE			
8th "	About 5 square miles in the Sylhet district.		4 minutes	N	About 2 tolas.	Severe.	Ditto.	28th "	Hubli-Sholapur Road, mile 1 and 2.		5 mts.	SE			
8th "	About 2 square miles in the Sylhet district.		About 5 minutes	N	About 1 1/2 seers?	Slight.	No damage.	28th "	Poona-Bangalore Road, mile 270 to 276.		10 mts.	SE			
8th "	About 3 square miles in the Sylhet district.		About 1 an hour.	NE	About 1 powah.	Slight.	Damaged bora crops to the ex- tent of nearly 2 annas.	28th "	Hubli-Kumta, Road, mile 26 and 27.		10 mts.	NE			
8th "	About 4 square miles in the Sylhet district.		About 4 minutes	S	About 2 tolas.	Severe.	No damage.	29th "	Hubli-Sholapur Road, mile 1 and 2.		6 mts.	SE			
8th "	About 2 square miles in the Sylhet district.		About 15 minutes.	N	About a seer?	Severe.	Bora crops largely damaged.	29th "	Poona-Bangalore Road, mile 251 to 256.		2 mts.	NE			
8th "	Almost through- out the juris- diction of Hin- gajiya in the South Sylhet sub-division.		About 15 or 20 minutes.	S	7 tolas.	Mode- rate.	No damage.	29th "	Dharwar-Halyal Road, mile 1 to 8.		2 mts.	NE			
8th "	Almost through- out the juris- diction of Raj- nagar in the South Sylhet sub-division.		5 minutes	NW	About 1/2 kachcha.	Slight.	Betel and chilly crops slightly damaged.	29th "	Dharwar-Tadas Road, up Yari- kop.		2 mts.	NE			
8th "	Almost through- out the juris- diction of Moti- ganj in the South Sylhet sub-division.		15 minutes.	NW	2 1/2 tolas.	Mode- rate.	Bora paddy and chilly, etc., crops damaged.	29th "	Dharwar-Sondatti Road, 1 to 4 miles.		2 mts.	NE	No information.	No information.	No information.
8th "	64 square miles in the Habe- ganj sub-dis- trict.		10 minutes.	N	Potato.	Slight.	Bora crops slightly damaged.	29th "	Dharwar Station Road.		2 mts.	NE			
9th "	A part of the sub-district of North Sylhet.		15 minutes.	NW	1 tola.	Mode- rate.	Damaged crops to the ex- tent of 2 annas.	29th "	Ranibenur Talu- ka.		5 mts.	NE			
15th "	A part of the sub-district of North Sylhet.		10 minutes.	S	1 a tola.	Slight.	No damage.	29th "	Poona-Bangalore Road, mile 272 to 277.		5 mts.	SE			
18th "	Almost through- out the juris- diction of Hin- gajiya, espe- cially at Sagar- nal in the South Sylhet sub- division.		15 or 20 minutes.	N and S	About 2 tolas.	Severe.	Damaged several houses.	29th "	Hubli-Kumta Road, mile 26 and 27.		10 mts.	NE			
20th "	About 9 square miles in the Sylhet district.		About 25 minutes	W	1 to 4 chhat- taks	Severe.	Houses, vege- tables, etc., damaged.	2nd Apl.	Poona-Bangalore Road, mile 267 to 279.		5 mts.	SE			
								2nd "	Hubli-Gadag Road, mile 103, 104, 107 to 109.	Even- ing	10 mts.	SE			
								2nd "	Hubli-Konur Road, mile 1 to 5.	"	Ditto	SE			
								8th "	Hubli-Gadag Road, mile 100 to 106.		8 mts.	SE			
									Hubli-Konur Road, mile 1 to 6.						
								9th "	Dharwar . .		1 mt.	NE			
								14th "	Hubli-Gadag Road, mile 103 to 108.		10 mts.	SE			
								17th May	Hubli-Konur Road, mile 1 to 4. Nargund . .		5 mts.	E			

DATE. Day, month and year.	Area affected by storm.	Hour of occurrence.	Duration of storm.	Direction from which it came.	Size or weight of largest stones.	Charac- ter of storm.	Estimate of damage caused by storm.	DATE. Day, month and year.	Area affected by storm.	Hour of occurrence.	Duration of storm.	Direction from which it came.	Size or weight of largest stones.	Charac- ter of storm.	Estimate of damage caused, by storm.
1899.	BOMBAY.														
	KANARA DISTRICT.														
28th Feb.	Reseolly to Tre- gaum in the Haliyal Taluka.	About 3 P.M.			$\frac{1}{4}$ " to $\frac{1}{2}$ " diameter	Not severe	No inform- ation.	1899. 28th Mar.	BOMBAY BIJAPUR DISTRICT. Near Kerur in the Badami Taluka.	Be- tween 7-30 and 8 P.M.			$\frac{1}{2}$ inch		No inform- ation.
30th Mar.	Reseolly to Has- gi near Haliyal.	About 3 P.M.			$\frac{1}{4}$ " to $\frac{1}{2}$ " diameter	Do.		26th Mar.	SATARA DISTRICT. Islampur in Ka- rad sub-division.				Small.		
4th April	Miles 61 and 62 of Belgaum-Kar- war Road and at Kumbharwada.				$\frac{1}{4}$ " to $\frac{1}{2}$ " diameter	Moder- ately severe.		"	Karad-Chiplain Road, mile No. 11 to 16.			SW	Small.		
6th "	Yellapur Town .				Pea	Do.		30th April	Mahableshwar side in Panch- gani sub-divi- sion.						
13th "	About 5 miles round about Yellapur except Kirwati side and in miles 10 and 11 of Yellapur- Baokapur Road.				$\frac{1}{4}$ " to $\frac{1}{2}$ " diameter	Do.		18th May	Newari, near the 22 mile of Kar- ad-Bijapur Road of Maini sub- division.				About $\frac{1}{2}$ inch in diameter		
24th "	Keseoli, Aloor, Ajgad, Yedoga on Haliyal-Supa Road.				$\frac{1}{4}$ " to $\frac{1}{2}$ " diameter	Not severe.		20th "	Mahuli in the 28 mile of Tasgaon- Pingli-Road of Maini sub-di- vision.						
9th May	Berchi from mile 7 to 14 on Hali- yal-Supa Road.				Betel- nut.	Do.		22nd "	Chitali on the 36 mile of Mathar- peith-Pandher- pur Road of Maini sub-divi- sion.						

Table

Abstract of observations taken at 8 A.M.

Number of District.	METEOROLOGICAL PROVINCE OR DISTRICT.	STATION.	Elevation of Bar Cistern above sea level in feet.	PRESSURE 8 A.M. IN INCHES.							TEMPERATURE OF AIR.											
				Mean actual pressure (reduced to 32°).	Variation from normal.	Mean pressure reduced to sea level and to constant gravity 45° Lat.	Highest pressure recorded during year.	Lowest pressure recorded during year.	Absolute range during year.	Mean monthly range of pressure.	Mean of 8 A.M. of year.	Mean maximum of year.	Variation from normal of year.	Mean minimum of year.	Variation from normal of year.	Mean daily temperature of year.	Variation from normal of year.	Mean daily range of temperature.	Highest temperature observed during year.	Lowest temperature observed during year.	Absolute range during year.	Mean monthly absolute range.
I.—Burma Coast and Bay Islands				...	...	-.002	...	...	...	...	...	87.8	+0.3	73.6	+0.9	80.8	+0.7	14.2	...	...	36.5	22.4
1	TENASSERIM AND BAY ISLANDS.	Car Nicobar . . .	25	29.884		29.837	29.997	29.678	.319	.149	80.5	86.6		76.6		81.6		10.0	92.6	67.1	25.5	17.0
		Port Blair . . .	61	29.865		29.857	30.032	29.618	.414	.158	80.0	87.2		77.2		82.2		10.0	95.4	69.4	26.0	16.8
		Mergui . . .	96	29.830	-.001	29.858	30.033	29.572	.461	.156	77.7	87.5	+0.1	73.0	+2.4	80.3	+1.3	14.5	95.1	62.3	32.8	22.4
		Tavoy . . .	26	29.910		29.827	30.098	29.629	.469	.163	75.9	88.0	+0.4	71.4	+0.7	79.7	+0.6	16.6	96.7	57.0	38.7	25.3
		Moulmein . . .	94	29.828		29.860	30.046	29.501	.545	.199	76.5	88.2	+0.2	72.4	+0.3	80.3	+0.3	15.8	99.4	59.4	40.0	24.7
2	LOWER BURMA .	Rangoon . . .	41	29.875	-.004	29.853	30.104	29.515	.589	.200	75.7	89.1	-0.2	72.2	?	80.7	?	16.9	102.1	58.2	43.9	25.4
		Bassein . . .	27	29.886	+0.002	29.148	30.118	29.511	.607	.209	76.1	87.7	-0.2	72.9	+1.0	80.3	+0.4	14.8	99.7	57.3	42.4	23.2
		Diamond Island .	41	29.873	+0.002	29.849	30.078	29.506	.572	.196	79.8	85.1	?	77.0	?	81.1	?	8.1	91.1	69.2	21.9	14.9
5	ARAKAN . . .	Akyab . . .	20	29.868	-.007	29.831	30.120	29.499	.621	.212	75.0	85.4	-0.8									
3	CENTRAL BURMA .	Toungco . . .	183	29.719	-.001	29.847	29.951	29.389	.592	.205	74.9	91.1	+1.2	70.1	+0.1	80.6	+0.7	21.0	105.7	48.6	57.1	31.7
II.—Burma Inland . . .				...	...	+0.005	...	...	...	...	...	89.5	-0.7	69.0	+0.4	79.3	-0.2	20.5	...	...	60.4	31.4
3	CENTRAL BURMA .	Thayetmyo . . .	134	29.759	-.001	29.837	30.018	29.420	.598	.212	75.9	91.5	-0.2	69.8	+0.3	80.7	+0.1	21.6	106.1	44.2	61.9	32.0
4	UPPER BURMA .	Minbu . . .	165	29.724	-.002	29.835	30.001	29.374	.627	.218	75.9	91.0	-1.1	71.2	+0.8	81.1	-0.2	19.8	107.1	49.0	58.1	30.0
		Yamethin . . .	657	29.233		29.849	29.489	28.931	.558	.207	74.7	91.2	-0.7	69.0	+0.3	80.1	-0.2	22.2	107.0	45.2	61.8	32.7
		Mandalay . . .	250	29.638	+0.008	29.840	29.914	29.318	.596	.236	76.9	91.7	-0.6	71.4	+0.6	81.6	0	20.3	108.1	50.7	57.4	31.2
		Kindat . . .	377	29.505		29.845	29.846	29.113	.733	.258	71.0	85.6	-0.8	67.0	+0.1	76.3	-0.4	18.6	105.7	43.3	62.4	29.6
		Bhamo . . .	381	29.518	+0.014	29.864	29.831	29.135	.696	.243	69.7	85.8	-0.7	65.2	+0.2	75.5	-0.3	20.6	104.1	43.2	60.9	31.7
(a) 4	BURMA HILL STATIONS.	Maymyo . . .			Not recorded.						65.5	76.8		52.8		64.8		24.0	94.0	27.4	66.6	33.9
Taunggyi . . .				Not recorded.						64.4	75.9		55.9		65.9		20.0	101.1	31.6	69.5	33.1	
Lashio . . .			27.090	-.029		27.335	26.798	.537	.219	66.4	82.6	+0.8	60.5	+1.0	71.6	+0.9	22.1	99.5	40.1	59.3	33.4	
III.—Assam . . .				...	...	-.002	...	...	...	...	...	82.5	-1.0	66.6	-0.6	74.6	-0.8	15.9	...	...	56.2	27.6
7	SURMA . . .	Silchar . . .	104	29.793	+0.007	29.852	30.094	29.385	.709	.249	72.0	85.6	-0.1	67.1	-0.3	76.4	-0.2	18.5	100.6	42.0	58.6	30.6
9	BRAHMAPUTRA .	Sibsagar . . .	333	29.563	-.006	29.862	29.888	29.182	.706	.253	68.8	80.2	-1.8	65.1	-0.9	72.7	-1.4	15.1	94.7	40.5	54.2	26.5
		Dhubri . . .	115	29.747	-.008	29.819	30.083	29.352	.731	.258	71.3	81.8	-1.2	67.6	-0.6	74.7	-0.9	14.2	100.7	44.8	55.9	25.7
IV.—Bengal and Orissa . . .				...	...	-.001	...	...	...	...	...	86.8	0	69.7	0	78.3	0	17.1	...	...	59.8	29.1
6	EAST BENGAL .	Chittagong . . .	87	29.782	-.018	29.818	30.064	29.391	.673	.233	74.2	84.3	0	69.0	-0.2	76.7	-0.1	15.3	94.7	46.6	48.1	25.9
		Noakhali . . .	43	29.823		29.813	30.110	29.434	.676	.236	73.6	85.0*		67.3		77.0*		16.0*	96.7	40.0	56.7	27.4
		Comilla . . .	36	29.833		29.818	30.116	29.445	.671	.231	74.9	85.9		68.5		77.2		17.4	98.3	43.1	55.2	27.9
		Sirajganj . . .	49	29.794		29.794	30.121	29.401	.720	.261	72.8	85.3		71.7†		79.5†		15.5†	107.8	48.9	58.9	23.8
		Narayanganj . .	26	29.834	-.004	29.808	30.135	29.428	.707	.256	75.0	85.1	-1.4	70.5	+0.2	77.8	-0.6	14.6	98.6	46.2	52.4	25.2
		Barisal . . .	13	29.847	+0.003	29.806	30.158	29.426	.732	.257	76.1	85.8	+0.5	70.3	-0.1	78.1	+0.2	15.5	98.3	44.2	54.1	27.0
		Mymensingh . .	59	29.802	-.005	29.814	30.115	29.442	.673	.248	73.0	83.2	-1.2									
		Faridpur . . .	46	29.815		29.810	30.125	29.362	.763	.261	73.4	85.5		68.7		77.1		16.9	102.8	43.0	59.8	28.6
		Jessore . . .	33	29.821	-.003	29.801	30.166	29.394	.772	.265	74.9	87.0	-0.8	69.5	-0.4	78.3	-0.6	17.5	107.0	42.1	64.9	30.0
		Calcutta . . .	21	29.833	0	29.800	30.133	29.394	.799	.262	75.7	88.1	+1.6	70.3	-0.2	79.2	+0.7	17.8	105.4	44.2	61.2	29.0
10	DELTAIC BENGAL .	Saugor Island . .	25	29.824	-.001	29.793	30.168	29.430	.738	.255	77.4	85.6	+0.1	73.4	-0.5	79.5	-0.2	12.2	95.9	46.0	49.9	23.6
		Krishnagar . . .	47	29.808		29.805	30.167	29.379	.788	.263	75.1	87.8		68.5		78.2		19.3	109.2	41.3	67.9	32.2
		Midnapore . . .	149	29.699		29.797	30.054	29.327	.727	.245	75.7	90.5		70.1		80.3		20.5	112.4	45.1	67.3	34.2
		Eankura . . .	298	29.520		29.774	29.873	29.119	.754	.246	74.7	89.7		69.7		79.7		20.0	112.1	45.8	66.3	33.6
		Raniganj . . .	334	29.505		29.795	29.852	29.120	.732	.246	73.6	89.7		68.7		79.2		21.0	113.3	44.2	69.1	34.7
11	CENTRAL BENGAL .																					

* Mean of 11 months.

† Mean of 10 months.

I.

at 214 stations in India, Burma, etc., in the year 1899.

WIND DIRECTION.									WIND VELOCITY.			HYGROMETRY, 8 A.M.		RAINFALL.						STATION.	METEOROLOGICAL PROVINCE OR DISTRICT.	Number of district.				
Number of winds from									Mean velocity in miles per hour.	Normal.	Percentage variations.	Mean humidity of year.	Mean vapour tension of year.	Mean cloud amount of year.	Number of rainy days during year.	Normal number of rainy days during year.	Variation.	Rainfall of year.	Normal rainfall of year.				Variation from normal.	Heaviest rainfall during year.		
Calm.	N	N.E.	E.	S.E.	S.	S.W.	W.	N.W.																		
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	132.22	139.52	-2.84	...	I.—Burma Coast and Bay Islands.		
33	35	62	10	35	43	41	2	6	2.5	...	...	84	.872	8.2	140	...	...	92.05	...	3.43	Car Nicobar . . .	TENASSERIM AND BAY ISLANDS.	1	
12	33	45	15	22	12	69	95	61	8.0	7.4	+8	86	.889	6.0	129	...	...	87.01	116.98	-29.97	2.56			Port Blair . . .
312	17	9	2	1	7	7	...	9	2.0	1.8	+22	89	.833	4.0	152	...	...	135.40	168.46	-33.06	3.74			Mergui.
344	1	1	3	...	...	8	2	5	0.9	...	...	89	.811	3.5	158	...	...	222.51	198.57	+23.94	7.05	Tavoy.	...	...
...	13	66	65	63	76	38	21	23	2.8	2.8	0	87	.797	5.0	144	137.55	+6.45	163.98	181.34	-17.36	6.80	Moulmein.				
1	25	50	29	23	59	105	61	12	4.1	4.4	-7	88	.720	5.2	117	116.89	+0.11	103.97	95.27	+8.70	5.90	Rangoon . . .			LOWER BURMA	2
64	19	46	17	46	39	38	23	73	4.6	3.8	+21	88	.812	4.5	127	131.54	-4.54	118.14	109.55	+8.59	9.90	Bassein.				
32	45	65	23	15	21	89	36	38	9.0	7.1	+27	80	.824	5.0	98	120.44	-22.44	84.40	118.66	-34.26	7.11	Diamond Island.	...	...
16	110	66	74	45	36	10	3	4	2.3	3.7	-38	90	.808	4.8	151	120.09	+30.91	226.18	187.08	+39.10	8.11	Akyab . . .			ARAKAN.	5
119	36	7	2	117	49	8	3	24	3.4	3.0	+13	85	.754	5.0	115	112.63	+2.37	88.53	79.77	+8.76	4.30	Toungoo.					CENTRAL BURMA.	3
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	55.45	46.55	+8.90	...	II.—Burma Inland.		
1	26	35	24	38	100	78	51	12	4.8	5.1	-6	78	.713	3.7	71	76.08	-5.08	34.07	37.67	-3.60	3.12	Thayetmyo . . .	CENTRAL BURMA.	3		
33	17	3	4	132	78	11	13	74	11.8	79	.727	4.6	56	41.23	28.06	+13.17	7.90	Minbu . . .			UPPER BURMA.	4
85	23	4	...	115	98	1	...	39	5.7	...	...	81	.715	3.8	73	...	...	43.15	34.46	+8.69	5.00	Yamethin.		
141	26	14	8	32	86	38	5	11	4.4	...	...	82	.773	3.7	56	...	...	41.61	33.73	+7.88	5.73	Mandalay.	...	...
214	53	18	14	9	16	8	17	16	1.4	90	.708	5.6	101	82.22	71.58	+10.64	4.73	Kindat.		
238	10	34	5	2	...	14	2	10	2.1	89	.676	6.0	113	90.39	73.80	+16.59	6.75	Bhamo.					BURMA HILL STATIONS.	4
34	4	47	6	22	41	159	33	18	...	...	...	80	.518	...	?	...	?	?	?	?	?	Maymyo . . .		
12	1	4	2	54	176	102	4	3	...	...	...	78	.486	4.3	117	...	...	67.98	64.33	+3.65	3.18	Taunggyi.		
...	...	...	...	...	...	...	...	...	...	...	...	84	.561	6.3	109	...	...	85.30	58.02	+27.28	6.67	Lashio.	...	...
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	110.38	104.92	+5.47	...	III.—Assam.		
280	3	14	54	8	2	...	1	3	1.8	2.7	-33	89	.745	6.2	147	138.69	+8.31	138.16	125.33	+12.83	7.54	Silchar . . .			SURMA.	7
218	50	59	3	2	5	10	...	13	2.2	2.4	-8	93	.711	7.9	143	129.16	+13.84	93.96	96.09	-2.13	3.16	Sibsagar . . .	BRAHMAPUTRA.	9		
61	5	89	150	17	24	14	4	1	4.6	4.7	-2	88	.713	5.0	96	92.14	+3.86	99.03	93.33	+5.70	4.35	Dhubri.				
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	79.61	72.09	+7.52	...	IV.—Bengal and Orissa.		
68	28	83	12	141	27	4	...	2	5.6	5.1	+10	87	.760	4.3	106	98.83	+7.17	129.69	105.25	+24.44	9.19	Chittagong . . .	EAST BENGAL.	6		
69	48	48	90	38	47	8	17	...	4.1	...	...	90	.776	5.0	125	107.63	+17.37	158.08	118.92	+39.16	8.24	Noakhali.		
110	21	9	35	83	103	...	2	2	4.4	82	.734	4.9	108	101.97	+6.03	97.07	89.39	+7.68	4.33	Comilla.		
117	13	14	31	44	77	27	13	29	2.3	...	...	90	.758	4.8	88	78.65	+9.35	72.83	61.55	+11.33	3.73	Sirajganj.		
41	30	26	30	80	74	40	16	28	5.8	4.5	+29	88	.793	6.4	114	94.57	+19.43	80.76	73.70	+7.06	4.40	Narayanganj.	...	...
137	24	24	10	49	70	25	5	21	2.9	87	.807	4.8	95	99.81	-4.81	88.44	77.95	+10.49	6.70	Barisal.		
168	5	4	60	84	25	8	1	3	0.8	88	.747	...	126	104.27	+21.73	104.26	87.23	+17.03	3.98	Mymensingh.					DELTAIC BENGAL.	10
192	22	1	11	24	100	11	1	...	1.7	...	...	91	.784	4.0	106	89.31	+16.69	80.95	68.54	+12.41	4.70	Faridpur.		
269	4	4	4	22	43	16	2	1	1.8	3.2	-44	87	.786	4.3	94	88.78	+5.22	70.65	65.46	+5.19	4.17	Jessore.	...	...
86	34	11	21	33	51	83	21	25	3.8	4.8	-21	85	.788	4.4	89	85.32	+3.68	71.95	63.68	+8.27	4.45	Calcutta.		
4	59	54	24	18	82	76	22	26	12.5	10.7	+17	87	.844	5.4	72	83.10	-11.10	80.17	71.79	+8.38	6.87	Saugor Island.				
14	27	12	44	58	78	31	56	45	3.9	...	...	83	.759	4.2	83	74.27	+8.73	63.43	54.04	+9.39	6.11	Krishnagar.	...	...
169	78	11	7	14	86	11	10	19	3.4	77	.721	2.7	72	75.92	-3.92	63.22	55.91	+7.31	4.28	Midnapore.			CENTRAL BENGAL.	11
320	1	2	3	14	3	4	14	3	0.9	...	...	73	.661	3.5	69	79.08	-10.08	50.37	56.26	-5.89	3.09	Bankura . . .		
186	8	13	21	22	20	19	34	42	1.7	...	...	75	.661	3.5	65	73.07	-8.07	40.10	54.30	-14.20	2.11	Raniganj.		

§ Wind observations of 358 days.

Table

Abstract of observations taken at 8 A.M.

Number of District.	METEOROLOGICAL PROVINCE OR DISTRICT.	STATION.	Elevation of Bar Cistern above sea level in feet.	PRESSURE 8 A.M. IN INCHES.							TEMPERATURE OF AIR.											
				Mean actual pressure (reduced to 32°).	Variation from normal.	Mean pressure reduced to sea level and to constant gravity 45° Lat.	Highest pressure recorded during year.	Lowest pressure recorded during year.	Absolute range during year.	Mean monthly range of pressure.	Mean of 8 A.M. of year.	Mean maximum of year.	Variation from normal of year.	Mean minimum of year.	Variation from normal of year.	Mean daily temperature of year.	Variation from normal of year.	Mean daily range of temperature.	Highest temperature observed during year.	Lowest temperature observed during year.	Absolute range during year.	Mean monthly absolute range.
11	CENTRAL BENGAL (concl.)	Burdwan . . .	99	29.751	-0.02	29.800	30.098	29.337	.761	.252	75.1	89.1	+0.3	70.2	-0.2	79.7	+0.1	18.9	112.5	46.6	65.9	31.6
		Naya Dumka . .	489	29.344		29.801	29.692	28.945	.747	.259	74.3	87.4		67.5		77.5		19.9	109.9	43.3	66.6	33.3
		Berhampore . . .	67	29.780	-0.11	29.796	30.130	29.358	.772	.268	73.9	87.0	-0.8	69.5	+0.1	78.3	-0.4	17.5	110.6	43.1	67.5	31.4
		Rampur Boalia . .	70	29.772		29.792	30.110	29.362	.748	.263	74.2	86.1		69.0		77.6		17.2	108.5	42.5	66.0	30.7
		Malda . . .	72	29.766		29.791	30.126	29.372	.754	.272	73.1	86.5		67.4		77.0		19.1	109.0	41.0	68.0	32.7
		Bogra . . .	61	29.776		29.790	30.106	29.399	.707	.254	72.9	85.5	-0.4	68.2	+0.5	76.9	+0.1	17.3	109.3	44.2	65.1	30.1
12	NORTH BENGAL	Dinajpur . . .	123	29.739	†	29.815	30.083	29.357	.726	.263	71.9	85.5	-0.4	66.6	-0.2	76.1	-0.3	18.9	105.8	42.0	63.8	31.5
		Rangpur . . .	123	29.717*		29.796*	30.072	29.345	.727	.270*	75.6†	86.9†		70.4†		78.7†		16.5†	102.7	47.2	55.5	28.6
		Jalpaiguri . . .	284	29.575	-0.01	29.824	29.916	29.187	.729	.263	71.6	83.3	-0.2	66.4	+1.0	74.9	+0.4	16.9	102.5	44.1	58.4	26.6
		Cooch Behar . . .	156	29.701		29.826	30.060	29.324	.736	.259	71.3	83.4		67.5		75.5		15.9	96.9	45.9	51.0	26.4
17	NORTH BIHAR	Purnea . . .	125	29.722	+0.01	29.805	30.074	29.342	.732	.275	71.3	85.7	-1.1	66.8	+0.8	76.3	-0.2	18.9	107.8	40.3	67.5	32.0
14	ORISSA . . .	Balasore . . .	46	29.805	+0.11	29.799	30.179	29.438	.741	.249	75.1	88.9	+1.2	70.0	-0.2	79.5	+0.5	18.9	106.0	45.9	60.1	31.7
		False Point . . .	21	29.839	+0.06	29.802	30.182	29.443	.739	.237	77.7	86.0	+0.2	71.7	-0.4	78.9	-0.1	14.3	101.0	45.9	55.1	27.2
		Cuttack . . .	80	29.779	+0.07	29.803	30.137	29.407	.730	.235	76.0	92.3	+0.9	72.1	-0.3	82.2	+0.3	20.1	111.5	48.6	62.9	32.3
		Shortt's Island . .	25	29.837		29.806	30.197	29.458	.739	.247	79.7	86.2		77.4		81.8		8.9	98.2	59.5	38.7	19.1
		Puri . . .	20	29.843*		29.806*	30.190	29.445	.745	.224*	78.6	87.6		74.6		81.1		13.1	102.2	52.1	50.1	24.4
	V.—Gangetic Plain and Chota Nagpur.			...	-0.03	...	...	...	...	...	88.4	+0.5	66.7	0	77.6	+0.2	21.7	...	...	70.3	34.8	
15	CHOTA NAAGPUR	Hazaribagh . . .	2,007	27.828	+0.01	29.804	28.126	27.502	.624	.223	72.2	85.4	+1.1	65.9	+0.6	75.7	+0.8	19.5	108.1	40.3	67.8	32.7
		Ranchi . . .	2,128	27.711	+0.08	29.804	28.000	27.377	.623	.220	72.2	85.4	+1.6	65.3	+0.9	75.4	+1.3	20.1	106.3	39.7	66.6	33.7
		Daltonganj . . .	730†	29.105		29.810	29.463	28.738	.725	.241	70.7	91.2		63.5		77.4		27.7	114.6	34.0	80.6	41.8
		Chaibassa . . .	760	29.076		29.799	29.406	28.703	.703	.232	73.5	91.0	+1.2	68.0	-0.6	79.5	+0.3	23.0	110.0	43.1	66.9	36.3
16	SOUTH BIHAR	Gaya . . .	375	29.460	-0.03	29.797	29.814	29.090	.724	.250	74.4	90.6	+0.8	68.2	-0.3	79.4	+0.3	22.4	113.0	43.0	70.0	35.7
		Dehri . . .	351	29.473		29.786	29.828	29.106	.722	.253	74.5	89.7		69.3		79.5		20.4	114.5	45.1	69.4	34.7
		Patna . . .	183	29.653	-0.10	29.793	30.031	29.284	.717	.249	73.7	86.8	-1.0	68.6	+0.4	77.7	-0.3	18.2	108.0	41.2	66.8	32.0
		Arrah . . .	190	29.637		29.784	30.015	29.261	.754	.252	72.9	88.5		66.7		77.6		21.8	109.4	40.7	68.7	35.7
		Buxar . . .	239	29.581		29.780	29.959	29.200	.759	.260	74.0	88.3		67.9		78.2		20.4	110.0	41.0	69.0	33.6
17	NORTH BIHAR	Bhagalpur . . .	160	29.675		29.791	30.040	29.298	.742	.262	74.0	86.8		67.8		77.4		19.0	108.8	42.7	66.1	32.4
		Darbhanga . . .	166	29.674	-0.10	29.796	30.024	29.295	.729	.257	72.8	85.3	-0.3	68.7	+0.1	77.0	-0.1	16.6	105.8	44.2	61.6	18.4
		Muzaffarpur . . .	178	29.652		29.788	30.018	29.281	.737	.263	72.7	85.3		67.0		76.2		18.3	105.2	41.8	63.4	30.0
		Motihari . . .	224	29.618		29.806	29.959	29.249	.750	.263	71.3	85.8		65.0		75.5		20.8	108.0	39.0	69.0	33.8
		Chapra . . .	181	29.652		29.791	30.019	29.275	.744	.252	72.6	87.4		67.8		77.6		19.6	108.7	42.2	66.5	33.0
18	N.-W. PROVINCES (EAST).	Benares . . .	267	29.560	-0.05	29.789	29.935	29.157	.778	.260	72.5	89.5	-0.1	66.6	-0.3	78.1	-0.2	22.9	112.3	37.9	74.4	36.5
		Allahabad . . .	309	29.521	-0.04	29.791	29.882	29.141	.741	.246	74.0	90.4	+0.5	66.3	-0.3	78.4	+0.1	24.1	113.1	36.4	76.7	38.2
23	N.-W. PROVINCES (EAST SUBMONTANE).	Gorakhpur . . .	256	29.575	+0.05	29.795	29.929	29.203	.726	.257	72.6	87.1	-1.0	67.0	-0.2	77.1	-0.6	20.1	109.7	41.5	68.2	34.0
19	SOUTH OUDH . .	Lucknow . . .	368	29.448	-0.12	29.785	29.813	29.071	.742	.263	72.0	91.0	+1.4	65.1	-0.2	78.1	+0.6	25.9	113.3	36.1	77.2	40.5
20	NORTH OUDH . .	Bahraich . . .	403	29.411		29.785	29.774	29.030	.744	.261	72.4	88.5		65.2		76.9		23.3	109.6	36.6	73.0	38.0
21	N.-W. PROVINCES (CENTRAL).	Cawnpore . . .	416	29.405	0	29.785	29.768	29.027	.741	.254	73.2	91.1	+1.7	65.7	-0.6	78.4	+0.5	25.4	113.6	36.0	77.6	39.4
		Mainpuri . . .	516	29.299		29.786	29.658	28.888	.770	.262	72.4	91.3		65.4		78.4		25.9	114.2	36.5	77.7	40.0
	VI.—Upper Sub-Himalayas			...	-0.05	...	...	...	...	...	89.5	+2.1	64.4	+1.5	77.0	+1.8	25.3	...	...	77.6	40.8	
24	N.-W. PROVINCES (WEST SUBMONTANE).	Bareilly . . .	569	29.242	-0.02	29.789	29.613	28.833	.780	.275	70.6	88.5	+1.0	64.8	+0.4	76.7	+0.7	23.7	111.0	35.2	75.8	38.5
		Dehra Dun . . .	2,233	27.589	-0.16	29.812	27.900	27.204	.696	.257	66.3	82.6	+1.8	60.5	-0.4	71.6	+0.7	22.1	104.5	35.0	69.5	34.7
		Roorkee . . .	887	28.919	-0.07	29.789	29.291	28.486	.805	.272	68.5	88.4	+1.2	61.8	-0.7	75.1	+0.3	26.6	112.2	32.7	79.5	41.6

* Mean of 11 months.

† Mean of 10 months.

I—contd.

at 214 stations in India, Burma, etc., in the year 1899—contd.

WIND DIRECTION.									WIND VELOCITY.			HYGROMETRY, 8 A.M.		Mean cloud amount of year.	RAINFALL.						Heaviest rainfall during year.	STATION.	METEOROLOGICAL PROVINCE OR DISTRICT.	Number of district.	
Number of winds from									Mean velocity in miles per hour.	Normal.	Percentage variation.	Mean humidity of year.	Mean vapour tension of year.		Number of rainy days during year.	Normal number of rainy days during year.	Variation.	Rainfall of year.	Normal rainfall of year.	Variation from normal.					
Calm.	N.	N. E.	E.	S. E.	S.	S. W.	W.	N. W.																	
185	11	12	10	17	36	49	25	20	2'1	3'3	-36	80	738	4'3	79	77'88	+1'12	67'85	55'13	+12'72	4'85	Burdwan.	CENTRAL BENGAL— <i>concl'd.</i>	11	
106	22	17	37	42	37	21	25	58	1'5			74	655	3'9	77	80'15	-3'15	72'20	57'64	+14'56	3'48	Naya Dumka.			
172	7	6	35	19	64	34	21	7	2'5	3'5	-29	84	741	4'6	75	79'22	-4'22	53'61	55'97	-2'36	3'11	Berhampore.			
98	44	27	16	46	56	37	31	10	4'1			85	750	3'9	75	74'85	+0'15	59'30	56'50	+2'80	4'24	Rampur Boalia.			
	60	61	36	58	54	23	42	31	2'3			84	715	3'9	78	69'31	+8'69	65'86	55'37	+10'49	4'30	Malda.			
					Not recorded.							87	739	4'1	94	81'51	+12'49	87'64	67'41	+20'23	4'89	Bogra.	NORTH BENGAL.	12	
3	33	75	109	41	23	18	27	36	3'5			84	694	4'5	100	76'91	+23'09	115'26	69'90	+45'36	8'75	Dinajpur.			
60	4	87	123	28	39	16	3	5	2'4			88†	798†	4'0	94	79'18	+14'52	85'24	81'57	+3'67	4'56	Rangpur.			
4	41	99	111	55	14	7	8	25	2'5			90	706	2'4	107	100'62	+6'38	121'32	127'76	-6'44	4'52	Jalpaiguri.			
106	12	61	91	78	16			1	1'9			87	700	5'9	105			131'42	131'13	+0'29	7'75	Cooch Behar.			
88	15	50	81	46	8	20	22	23	4'1	2'4	+71	86	697	4'4	86	70'60	+15'40	91'98	64'11	+27'87	5'55	Purnea.	NORTH BIHAR.	17	
44	55	14	5	3	38	110	26	70	4'2			83	758	3'6	70	82'32	-12'32	72'93	65'56	+7'37	7'46	Balasore.			ORISSA.	14
17	56	4	5	8	28	92	82	73	7'3	9'1	-20	86	839	5'2	72	74'44	-2'44	51'51	69'87	-18'36	6'62	False Point.			
161	5	18	10	1	15	73	65	17	2'4	3'4	-29	80	746	4'3	58	76'99	-18'99	57'55	63'42	-5'87	11'52	Cuttack.	V.—Gangetic Plain and Chota Nagpur.	15	
1	39	42	9	10	9	160	54	38	13'8			81	833	3'4	62			45'45	52'99	-7'54	5'78	Shortt's Island.			
76	86	16	4	3	4	120	35	24	10'8			82	832	3'6	54	66'23	-12'23	36'77	56'62	-19'85	5'57	Puri.			
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	51'42	44'79	+6'63		
27	11	8	23	20	46	55	132	43	7'5	6'8	+10	59	489	4'5	68	76'10	-8'10	45'60	52'38	-6'78	2'19	Hazaribagh.	CHOTA NAGPUR.	15	
49	16	13	14	8	49	68	70	77	6'5			61	532	3'8	58	82'99	-24'99	38'76	56'47	-17'71	2'32	Ranchi.			
161	9	4	33	32	53	33	31	9	4'6			68	541	2'4	48	63'31	-15'31	31'12	45'48	-14'36	4'25	Daltonganj.			
246	1	8	3	2	2	47	46	10	2'0			73	636	2'3	64	76'20	-12'20	43'53	54'10	-10'57	3'38	Chaibassa.			
85	4	27	30	55	53	57	51	3	4'5	2'6	+73	71	635	3'0	65	57'26	+7'74	54'86	44'95	+9'91	4'90	Gaya.			SOUTH BIHAR.	16
7	8	9	33	20	75	140	45	13	5'0			65	575	2'8	51	54'84	-3'84	43'91	43'11	+0'80	4'00	Dehri.			
20	3	34	90	39	26	67	61	25	4'4	3'0	+48	74	658	3'3	67	55'23	+11'77	53'31	45'13	+8'18	4'92	Patna.			
74	8	13	39	49	25	41	73	33	2'3			77	659	2'5	54	57'06	-3'06	55'14	43'88	+11'26	4'50	Arrah.			
20	11	10	86	28	40	38	115	16	4'9			68	608	2'8	54	54'82	-0'82	48'77	41'89	+6'88	6'78	Buxar.	NORTH BIHAR.	17	
173	3	31	34	47	17	32	19	9	?			77	680	4'0	65	61'01	+3'99	73'94	46'73	+27'21	7'53	Bhagalpur.			
64	19	19	95	75	12	14	37	30	2'8	3'6	-22	83	706	2'9	75	58'46	+16'54	64'90	48'99	+15'91	5'59	Darbhanga.			
184	3	21	67	38	4	19	21	6	2'3			83	708	2'1	74	56'07	+17'93	103'79	47'24	+56'55	7'72	Muzaffarpur.			
	15	68	166	21	14	24	33	24	4'0			88	720	1'9	68	56'43	+11'57	55'07	52'98	+2'09	4'55	Motihari.			N.W. PROVINCES (EAST).	18
132	5	13	69	30	17	47	38	14	3'0			80	683	3'3	60	52'25	+7'75	60'95	42'43	+18'52	4'43	Chapra.			
165	3	12	22	31	9	75	30	18	2'3	3'9	-41	72	611	3'1	52	50'54	+1'46	53'32	39'43	+13'89	6'20	Benares.			
66	6	17	54	11	21	40	103	47	5'5	4'6	+20	66	574	2'9	48	48'47	-0'47	40'72	39'44	+1'28	2'91	Allahabad.			
60	48	72	47	24	23	18	44	29	1'9	2'5	-24	77	654	3'3	70	52'29	+17'71	68'84	51'35	+17'49	7'06	Gorakhpur.	N.W. PROVINCES (EAST SUBMONTANE).	23	
59	28	17	57	24	24	26	99	31	2'2	3'1	-29	67	567	3'1	43	46'83	-3'83	35'33	38'80	-3'47	3'85	Lucknow.	SOUTH OUDH.	19	
103	10	11	88	62	4	10	37	40	2'3			72	608	1'9	55			36'04	40'94	-4'90	2'72	Bahraich.	NORTH OUDH.	20	
158	9	8	20	19	6	42	88	15	2'7			62	533	2'0	43	41'40	+1'60	43'91	31'80	+12'11	4'90	Cawnpore.	N.W. PROVINCES (CENTRAL).	21	
119	16	3	34	15	23	7	136	12	2'7			60	509	3'5	40			28'12	33'09	-4'97	4'67	Mainpuri.			
...	18'74	37'82	-18'32	...		VI.—Upper Sub-Himalayas.		24
217	2	24	26	25	3	12	16	40	1'7	3'5	-52	68	543	2'8	37	47'17	-10'17	30'99	49'61	-18'62	2'94	Bareilly.	N.W. PROVINCES (WEST SUBMONTANE).		
235	15	15	10	14	17	11	30	18	1'6	1'8	-11	65	453	3'4	67	79'59	-12'59	60'77	88'88	-28'11	4'17	Dehra Dun.			
270	3	4	1	50	8	2	4	23	2'7	2'5	+8	64	478	2'3	35	46'57	-11'57	21'97	43'82	-21'85	4'10	Roorkee.			

¶ Wind observations of 350 days.

† Wind observations of 353 days.

Table

Abstract of observations taken at 8 A.M.

Number of District.	METEOROLOGICAL PROVINCE OR DISTRICT.	STATION.	Elevation of Bar Cistern above sea level in feet.	PRESSURE 8 A.M. IN INCHES.							TEMPERATURE OF AIR.											
				Mean actual pressure (reduced to 32°).	Variation from normal.	Mean pressure reduced to sea level and to constant gravity 45° Lat.	Highest pressure recorded during year.	Lowest pressure recorded during year.	Absolute range during year.	Mean monthly range of pressure.	Mean of 8 A.M. of year.	Mean maximum of year.	Variation from normal of year.	Mean minimum of year.	Variation from normal of year.	Mean daily temperature of year.	Variation from normal of year.	Mean daily range of temperature.	Highest temperature observed during year.	Lowest temperature observed during year.	Absolute range during year.	Mean monthly absolute range.
22	N.-W. P., WEST	Meerut . . .	738	29.065	-.009	29.789	29.427	28.637	.790	.263	69.8	90.2	+2.5	64.4	+0.8	77.3	+1.7	25.8	111.3	36.0	75.3	39.6
26	SOUTH EAST PUNJAB	Delhi . . .	718	29.096	-.004	29.793	29.460	28.670	.790	.264	72.8	90.1	?	68.5	+1.3	79.3	?	21.6	110.7	39.4	71.3	36.0
28	CENTRAL PUNJAB	Lahore . . .	702	29.098	-.006	29.790	29.497	28.602	.895	.307	70.6	91.5	+2.9	64.4	+3.1	78.0	+3.0	27.1	116.6	32.2	81.4	44.2
27	SOUTH PUNJAB	Sirsa . . .	662	29.158	+0.006	29.799	29.543	28.705	.838	.288	73.9	93.6†	+2.0	68.3	+3.0	82.1	+2.7	27.5	115.8	40.5	75.3	43.9
		Patiala . . .	818	28.988		29.792	29.369	28.541	.828	.280	71.6	89.4		64.7		77.1		24.8	112.2	34.0	78.2	40.4
29	PUNJAB (SUBMONTANE).	Ludhiana . . .	812	28.988	-.010	29.790	29.380	28.525	.855	.288	70.4	89.5	+0.9	65.1	+1.9	77.3	+1.4	24.4	113.9	34.5	79.4	40.5
		Sialkot . . .	830	28.969	+0.001	29.792	29.375	28.475	.900	.304	73.5	93.0	+3.5	67.2	+3.3	80.1	+3.4	25.8	115.9	39.1	76.8	43.3
		Umballa . . .	892	28.913		29.794	29.287	28.470	.817	.277	68.5	89.6		63.3		76.5		26.3	112.9	34.0	78.9	41.4
31	NORTH PUNJAB	Rawalpindi . .	1,676	28.133	-.003	29.798	28.491	27.666	.828	.316	65.8	87.2	+3.1	59.4	+2.3	73.3	+2.7	27.8	115.0	27.9	87.1	45.2
	VII.—Indus Valley and North-West Rajputana.			...	-.007	...	...	...	...	...	...	93.3	+2.1	66.2	+1.1	79.7	+1.6	27.1	...	...	83.7	42.4
31	NORTH PUNJAB	Peshawar . . .	1,110	28.716	-.019	29.793	29.117	28.188	.929	.346	68.6	87.3	+1.7	60.5	+1.6	73.9	+1.7	26.8	115.5	28.9	86.6	42.6
32	WEST PUNJAB	Khushab . . .	612	29.198		29.798	29.599	28.670	.929	.325	71.6	91.8		64.5		78.2		27.3	118.9	25.0	93.9	44.3
		Montgomery . .	558	29.242	-.009	29.780	29.652	28.751	.901	.324	74.0	93.5	?	65.0	?	79.3	?	28.5	117.5	32.0	85.5	45.5
		D. I. Khan . . .	594	29.236	-.014	29.793	29.699	28.711	.988	.369	70.7	91.3	+1.2	63.1	+0.7	77.2	+1.0	28.2	117.2	29.0	83.2	44.2
		Mooltan . . .	420	29.380	-.022	29.780	29.815	28.876	.939	.352	71.9	93.9	+2.7	66.7	+2.1	80.3	+2.4	27.2	118.5	32.5	86.0	42.3
47	SIND	Jacobabad . . .	186	29.620	-.010	29.771	30.102	29.110	.992	.335	73.2	98.3	+3.3	65.5	+0.8	81.9	+2.0	32.8	123.0	32.0	91.0	49.6
		Hyderabad . . .	96	29.750	+0.017*	29.801	30.196	29.259	.937	.290	74.3	94.8	+1.8	67.9	-0.4	81.4	+0.7	26.9	118.7	37.0	81.7	41.1
		Kurrachee . . .	30	29.844	+0.006	29.825	30.244	29.384	.830	.268	76.7	93.3	+0.9	70.3	+0.4	79.9	+0.7	19.0	111.4	40.5	70.9	33.0
51	WEST RAJPUTANA	Bikaner . . .	771	29.044		29.800	29.467	28.628	.839	.289	75.9	94.6	+3.1	70.1	+2.7	82.4	+3.0	24.5	115.8	38.1	77.7	39.2
		Pachpadra . . .	380	29.477		29.823	29.849	29.062	.787	.265	7.31	96.3		65.5		80.9		3.8	115.8	31.9	83.9	44.8
		Jodhpur . . .	782	29.055		29.830	29.482	28.654	.828	.269	75.1	91.7		68.9		81.8		25.8	113.3	38.1	75.2	39.6
	VIII.—East Rajputana, Central India and Gujarat.			...	+0.007	...	...	...	...	...	...	92.8	+2.9	68.2	+1.7	80.5	+2.2	24.6	...	...	71.3	38.0
50	EAST RAJPUTANA	Jaipur . . .	1,431	28.421	+0.004	29.835	28.731	28.052	.679	.249	73.8	93.1	+3.1	67.0	+2.4	80.1	+2.7	26.1	112.5	36.2	76.3	41.3
		Kotah . . .	819	29.018		29.837	29.371	28.659	.712	.249	77.7	95.0		71.6		83.3		23.4	115.6	42.5	73.1	37.2
		Sambhar . . .	1,254	28.590	+0.011	29.833	28.913	28.224	.689	.248	72.3	92.7	+3.7	66.5	+2.0	79.6	+1.9	26.2	112.0	33.0	79.0	41.2
		Ajmer . . .	1,611	28.245	?	29.850	28.574	27.885	.689	.247	71.5	92.0	+3.4	66.6	+3.2	79.3	+3.3	25.4	110.4	33.5	76.9	39.6
		Udaipur . . .	1,925	27.953		29.855	28.233	27.613	.620	.229	73.6	90.4		65.9		78.2		24.5	108.1	34.7	73.4	38.7
		Deesa . . .	466	29.412	+0.012	29.841	29.707	29.048	.659	.228	76.5	96.1†	+4.0†	68.7†	+2.0†	82.2†	+3.0†	27.7	113.1	38.5	74.6	39.5†
46	KATHIAWAR AND CATCH.	Bhuj . . .	395	29.493	?	29.848	29.791	29.086	.705	.236	76.5	93.0	+1.9	69.0	+0.3	81.0	+1.1	24.0	109.8	43.5	66.3	35.7
		Rajkot . . .	429	29.462	+0.015	29.852	29.716	29.100	.616	.217	74.5	95.1	+2.2	66.1	+0.1	80.6	+1.2	29.1	111.9	38.1	73.8	41.8
		Veraval . . .		29.889		29.849	30.123	29.535	.588	.204	75.9	85.2		71.0		78.2		14.2	101.6	48.3	53.3	26.6
		Bhavnagar Para .	35	29.864†		29.845†	30.148	29.517	.631	.217	76.7	95.9		69.0		82.5		26.9	111.7	40.7	71.0	41.0
49	CENTRAL INDIA	Nowgong . . .	757	29.088†	+0.001	29.820†	29.419	28.698	.721	.238	71.9	90.0	?	65.7	+0.3	77.9	?	24.3	112.5	35.5	77.0	38.5
		Indore . . .	1,823	28.067	+0.025	29.861	28.336	27.762	.574	.215	73.1	90.5	+3.1	64.2	+0.7	77.4	+1.9	26.3	108.0	37.6	70.4	39.4
		Neemuch . . .	1,630	28.255	+0.008*	29.862	28.552	27.918	.634	.233	74.2	91.5	+2.9	65.5	+1.2	78.4	+2.1	26.0	110.1	37.0	73.1	40.0
45	GUJARAT	Surat . . .	39	29.865†	+0.007	29.847†	30.112	29.495	.617	.211	77.2	93.9	+2.6	70.3	+1.4	82.1	+2.0	23.6	109.1	46.3	62.8	35.5
		Ahmedabad . . .	164	29.751		29.865	30.054	29.405	.649	.222	78.1	97.0		71.7		84.4		25.3	111.8	47.2	64.6	36.8
22	N.-W. P., WEST	Agra . . .	555	29.268	-.010	29.794	29.642	28.841	.801	.265	74.1	92.4	+1.9	68.9	+1.6	80.7	+1.7	23.5	114.5	38.9	75.6	36.9
31	N.-W. P., CENTRAL.	Jhansi . . .	858	28.970	0	29.795	29.339	28.599	.740	.251	76.8	93.3	+2.6	71.6	+3.4	82.5	+3.0	21.7	113.4	42.9	70.5	36.7
	IX.—Deccan.			...	+0.015	...	...	...	...	...	...	92.4	+2.6	67.6	+0.6	80.0	+1.6	24.8	...	...	66.4	37.4
38	BOMBAY DECCAN	Belgaum . . .	2,539	27.380	+0.013	29.866	27.555	27.114	.441	.164	71.0	84.5	+0.2	63.4	-0.5	74.0	-0.1	21.1	100.8	48.0	52.8	21.4
		Sholapur . . .	1,590	28.324	+0.019	29.872	28.551	28.013	.538	.185	76.5	95.0	+2.4	68.9	+1.2†	82.0	+1.9†	26.1	109.7	49.1	60.6	36.2
		Poona . . .	1,840	28.081	+0.017	29.893	28.304	27.763	.511	.187	71.3	91.5	+2.7	63.8	-1.2	77.7	+0.8	27.6	105.0	43.5	61.5	38.3
		Bijapur . . .	1,946	27.984†		29.895†	28.187	27.695	.492	.178	74.1†	92.1		66.7		79.4		25.4	106.7	40.6	66	5

* Mean of 10 months.

† Mean of 11 months.

I—contd.

at 214 stations in India, Burma, etc., in the year 1899—contd.

WIND DIRECTION.									WIND VELOCITY.			HYGROMETRY 8 A.M.		Mean cloud amount of year.	RAINFALL.					Heaviest rainfall during year.	STATION.	METEOROLOGICAL PROVINCE OR DISTRICT.	Number of District.	
Number of winds from									Mean velocity in miles per hour.	Normal.	Percentage variation.	Mean humidity of year.	Mean vapour tension of year.		Number of rainy days during year.	Normal number of rainy days during year.	Variation.	Rainfall of year.	Normal rainfall of year.					Variation from normal.
Calm.	N.	N.E.	E.	S.E.	S.	S.W.	W.	N.W.																
187		3	26	24	1	22	79	15	1.9	2.2	-14	64	.511	3.0	26	39.18	-13.18	17.76	32.89	-15.13	2.45	Meerut	N.-W. P., West.	22
58	11	4	40	26	14	4	147	61	4.6	3.6	+28	49	.429	2.7	25	33.74	-8.74	12.12	30.03	-17.91	1.30	Delhi	SOUTH-EAST PUNJAB.	26
158	20	10	34	51	23	15	29	25	2.4	2.5	-4	57	.471	2.2	14	28.26	-14.26	6.21	21.95	-15.74	1.51	Lahore	CENTRAL PUNJAB.	28
3	13	62	15	102	7	89	15	59	6.9	3.6	+92	44	.399	2.7	5	23.39	-18.39	2.24	15.55	-13.31	0.83	Sirsa	SOUTH PUNJAB.	27
160	25	14	9	94	8	3	12	40	3.1			62	.515	2.1	24			10.34			1.30	Patiala		
164	10	19	9	60	17	12	32	42	2.8	1.5	+87	57	.450	2.5	20	37.00	-17.00	9.31	30.90	-21.59	2.02	Ludhiana	PUNJAB (SUBMONTANE).	29
116	38	50	77	35	9	6	13	21	2.5	1.8	+39	56	.487	1.9	27	38.36	-11.36	12.97	34.12	-21.15	1.80	Sialkot.		
233	3	3	17	38	1		12	58	1.7			67	.504	1.9	32			18.29	33.11	-14.82	1.80	Umballa.		
284	15	6	18	5	1	3	17	16	1.7	2.0	-15	63	.441	2.4	42	46.81	-4.81	21.93	35.17	-13.24	2.25	Rawalpindi	NORTH PUNJAB.	31
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	2.79	9.66	-6.87	...	VII.—Indus Valley and North-West Rajputana.		
214	31	11	5	6	38	17	24	19	2.7	3.4	-21	59	.448	2.8	17	21.56	-4.56	9.30	13.54	-4.24	1.57	Peshawar	NORTH PUNJAB.	31
89	28	101	63	13	22	24	16	9	6.0			47	.412	1.5	11	16.40	-5.40	4.38	10.39	-6.01	1.72	Khushab	WEST PUNJAB.	32
60	27	27	36	53	54	66	23	19	7.0			42	.378	1.7	6	15.70	-9.70	0.92	10.88	-9.96	0.27	Montgomery.		
199	38	61	3	23	4	5	5	27	2.3	1.8	+28	59	.485	1.9	11	14.73	-3.73	6.00	8.42	-2.42	2.84	D. I. Khan.		
142	15	54	3	30	28	72	3	18	2.3	2.5	-8	54	.465	1.6	7	11.72	-4.72	3.28	7.56	-4.28	0.74	Mooltan.		
122	21	13	67	78	15	4	12	33	3.6	3.4	+6	54	.487	1.5	3	6.63	-3.63	2.00	4.08	-2.08	1.60	Jacobabad	SIND.	47
65	45	8		1	29	148	32	37	16.1	10.1	+79	53	.488	2.3	1	10.14	-9.14	1.11	7.06	-5.95	1.11	Hyderabad.		
36	12	56	36	6	3	49	134	33	9.3	13.3	-30	70	.665	2.8	2	9.73	-7.73	0.63	7.92	-7.29	0.29	Kurrachee.		
14	26	27	20	17	67	107	54	33	8.0	4.8	+67	56	.561	1.5	5			1.14	11.95	-10.81	0.46	Bikaner	WEST RAJPUTANA.	51
16	17	49	27	15	37	112	31	15	8.9	5.8	+53	48	.455	2.6	2			0.95	10.28	-9.33	0.62	Pachpadra.†		
79	41	57	7	1	21	94	56	9	4.9			41	.401	2.5	2			1.01	14.16	-13.15	0.53	Jodhpur.		
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	13.20	30.12	-16.22	...	VIII.—East Rajputana, Central India and Gujarat.		
44	44	49	16	6	9	35	88	74	4.3	5.1	-16	51	.455	2.6	18	38.70	-20.70	11.44	28.76	-17.32	3.03	Jaipur	EAST RAJPUTANA.	50
94	24	13	9	13	3	54	98	57	5.0	?		42	.410	1.6	16			15.57	29.92	-14.35	7.29	Kotah.		
167	15	12	9	5	6	21	107	23	5.9	6.7	-12	48	.416	2.4	13	32.56	-19.56	9.01	22.91	-13.90	3.65	Sambhar		
141	8	15	1	8	9	32	129	22	5.8	4.3	+35	57	.447	2.3	18	32.99	-14.99	10.00	22.18	-12.18	2.60	Ajmer.		
99	31	11	3	7	13	57	80	63	5.9			44	.396	1.7	14			10.16			2.87	Udaipur.		
	18	60	79	20	16	87	57	27	10.4	10.3	+1	49	.566	2.3	6	28.81	-22.81	2.00	26.73	-24.73	0.52	Deesa.		
21	35	10	17	3	5	72	162	40	13.3	10.2	+30	63	.600	2.8	2			0.86	14.61	-13.75	0.57	Bhuj	KATHIAWAR AND Cutch.	46
64	39	5	36	2	25	22	148	17	9.7	9.2	+5	65	.608	2.4	11	33.94	-22.94	7.80	28.67	-20.87	2.15	Rajkot.‡		
3	94	52	4	7	8	63	79	55	7.9			69	.648	3.0	9			4.95	21.02	-16.07	3.15	Veraval.		
1	20	12	7	4	5	134	68	114	9.8			50	.499	2.3	11			5.79			1.80	Bhavnagar Para.		
38	17	5	50	11	16	75	140	13	2.9	2.5	+16	63	.516	3.3	35	49.75	-14.75	42.35	44.43	-2.08	6.72	Nowgong	CENTRAL INDIA.	49
95	33	25	2	10	11	40	109	40	4.6	4.2	+10	58	.504	2.8	20	48.00	-28.00	15.75	34.91	-19.16	2.68	Indore.		
42	16	84	16	15	3	60	93	32	10.0	10.1	-1	53	.488	2.3	16	39.18	-23.18	12.01	32.26	-20.25	2.22	Neemuch.		
39	29	50	43	30	32	107	20	15	5.7	9.0	-37	64	.633	3.1	23	49.36	-26.36	18.49	46.34	-27.85	5.77	Surat	GUJARAT.	45
17	43	60	25	6	36	75	21	68	6.0			51	.521	2.8	9			5.14	30.32	-25.18	1.20	Ahmedabad.¶		
31	2	38		53	2	126		113	5.2	4.2	+24	55	.499	2.2	35	38.91	-3.91	23.51	29.12	-5.61	2.72	Agra	N.-W. P., West.	22
69	5	9	21	8	5	80	88	76	4.1	2.9	+41	48	.473	1.9	38	49.07	-11.07	29.56	39.63	-10.07	4.20	Jhansi	N.-W. P., Central.	31
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	19.65	.39	-21.62	...	IX.—Deccan.		
64	22	18	35	38	13	55	80	40	14.8	15.7	-6	69	.529	3.9	75	53.08	-8.08	30.55	48.74	-18.19	2.50	Belgaum	BOMBAY, DECCAN.	38
29	15	22	29	66	5	54	51	94	14.6	8.9	+64	45	.428	3.3	21	51.00	-30.00	12.81	33.90	-21.09	2.39	Sholapur.		
26	12	7	9	11	8	81	136	75	11.7	10.0	+17	59	.479	3.5	26	49.36	-23.36	13.20	28.74	-15.54	1.40	Poona.		
23	2	13	46	35	8	52	125	61	7.0			67†	.573	2.4	24	43.52	-19.52	17.85	16.58	+1.27	2.78	Bijapur.		

‡ Wind observations of 358 days.

¶ Wind observations of 351 days.
1 " " 319 "

Table

Abstract of observations taken at 8 A.M.

Number of District,	METEOROLOGICAL PROVINCE OR DISTRICT.	STATION,	Elevation of Bar Cistern above sea level in feet.	PRESSURE 8 A.M. IN INCHES.							TEMPERATURE OF AIR.													
				Mean actual pressure (reduced to 32°).	Variation from normal.	Mean pressure reduced to sea level and to constant gravity 45° Lat.	Highest pressure recorded during year.	Lowest pressure recorded during year.	Absolute range during year.	Mean monthly range of pressure.	Mean of 8 A.M. of year.	Mean maximum of year.	Variation from normal of year.	Mean minimum of year.	Variation from normal of year.	Mean daily temperature of year.	Variation from normal of year.	Mean daily range of temperature.	Highest temperature observed during year.	Lowest temperature observed during year.	Absolute range during year.	Mean monthly absolute range.		
40	KHANDESH . . .	Malegaon . . .	1,430	28.466	+0.012	29.871	28.714	28.143	.571	.194	74.9	94.6	+3.7	65.0	+0.3	79.8	+2.0	29.6	109.3	37.2	72.1	43.2		
		Ahmednagar . .	2,152	27.779		29.887	27.997	27.460	.537	.194	73.8	91.3		62.8		77.1		28.5	105.9	37.9	68.0	41.6		
41	BERAR . . .	Akola . . .	930	28.961	+0.023	29.853	29.275	28.651	.624	.218	76.4	96.5	+4.4	67.7	+1.0	82.1	+2.7	28.8	112.6	39.7	72.9	42.2		
		Amraoti . . .	1,215	28.671	+0.029	29.849	28.974	28.368	.606	.216	77.6	95.3	+2.9†	70.2	+1.4†	82.8	+2.2†	25.1	112.5	43.9	68.6	36.9		
42	CENTRAL PROVINCES, WEST.	Khandwa . . .	1,044	28.847	+0.028	29.863	29.158	28.524	.634	.225	75.3	95.2	+4.1	67.7	+1.3	81.5	+2.7	27.5	110.7	36.2	74.5	42.9		
		Hoshangabad . .	1,006								73.6	92.5	+2.7†	66.8†	+0.5†	78.1†	+1.6†	24.1†	112.5	40.2	72.3	37.6		
		Nagpur . . .	1,025	28.845	+0.017	29.837	29.185	28.526	.659	.222	76.3	95.0	+3.4	69.4	+1.0	82.2	+2.2	25.6	114.2	40.6	73.6	38.3		
43	CENTRAL PROVINCES, CENTRAL.	Chanda . . .	634	29.264	+0.011	29.852	29.591	28.961	.630	.217	76.2	95.6	+3.1	68.4	-0.1	82.0	+1.5	27.2	114.2	37.1	77.1	41.1		
		Seoni . . .	2,033	27.844	+0.017	29.837	28.134	27.512	.622	.218	73.5	89.9	+2.3	65.8	+1.0	77.9	+1.7	24.1	108.4	38.5	69.9	37.8		
		Jubbulpore . .	1,327	28.519	†	29.827	28.846	28.138	.708	.225	71.6	90.2	+2.2	64.6	+0.3	77.5	+1.3	25.6	111.5	34.9	76.6	39.2		
		Saugor . . .	1,807	28.066	+0.021*	29.838	28.366	27.691	.675	.219	75.3	89.7	+1.6*	68.1	+2.1*	78.8	+1.9*	21.6	109.4	41.0	68.4	35.0		
49	CENTRAL INDIA .	Sutna . . .	1,040	28.794	+0.002	29.813	29.139	28.420	.719	.244	73.5	89.4	+1.7	66.2	+1.1	77.8	+1.4	23.2	110.6	36.1	74.5	37.3		
44	CENTRAL PROVINCES, EAST.	Raipur . . .	970	28.888	+0.014	29.821	29.229	28.553	.676	.216	76.1	92.5	+2.5	69.6	+0.7	81.1	+1.3	22.9	111.5	45.9	65.6	37.4		
		Sambalput . .	486	29.374	+0.004	29.818	29.745	29.024	.721	.226	75.4	92.0	+0.8*	69.9	0*	80.9	+0.4*	22.1	110.1	42.2	67.9	35.1		
39	HYDERABAD, NORTH.	Indur . . .				Not recorded.					77.5	93.0		68.5		80.7		24.5	108.4	40.9	67.5	38.2		
		Bidar . . .	2,165	27.737†		29.843†	27.947	27.486	.461	.175	76.2	90.7		67.7		79.2		23.0	100.0	51.7	48.3	32.7		
39	HYDERABAD, SOUTH	Gulbarga . .	1,502	28.436†		29.897†	28.664	28.150	.514	.187	75.8*	94.4		68.3		81.4		26.1	109.0	45.7	63.3	38.1		
		Raichur . . .	1,309	28.604		29.869	28.826	28.333	.493	.172	77.5	93.3		71.3		82.3		22.0	106.0	50.2	55.8	34.7		
		Hyderabad (Dn.)	1,690	28.213	+0.009†	29.863	28.444	27.948	.496	.185	75.1	92.2	+2.1	69.0	+1.0	80.6	+1.5	23.2	106.4	47.3	59.1	34.0		
		Secunderabad .	1,787	28.117	+0.004	29.864	28.344	27.861	.483	.184	74.4	93.1	+3.1	69.2	+1.2	81.2	+2.1	24.0	108.8	47.2	61.6	35.2		
		Hanumkonda .		29.014			29.298	28.746	.552	.197	78.4	93.2		71.9		82.6		21.3	109.7	48.1	61.6	33.9		
X.—West Coast.				...	+0.016	...	...	...	...	...	86.3	+0.5	74.0	+0.1	80.2	+0.3	12.2				32.5	19.4
37	KONKAN . . .	Bombay . . .	37	29.891	+0.021	29.868	30.096	29.534	.562	.193	78.2	86.3	+0.7	75.2	+0.6	80.8	+0.7	11.0	93.5	59.0	34.5	18.1		
		Ratnagiri . . .	110	29.811	+0.023	29.860	29.996	29.459	.537	.179	78.4	87.5	+0.3	73.6	+0.9	80.6	+0.6	13.9	97.4	59.0	38.4	22.9		
		Mormugao . . .	60	29.863		29.858	30.047	29.606	.441	.166	78.0	85.9		74.5		80.2		11.1	93.0	62.3	30.7	18.2		
		Goa . . .	100	29.732	+0.026*	29.870	29.928	29.489	.439	.165	78.1	85.0		74.5		79.8		10.5	92.0	63.0	29.0	17.6		
		Karwar . . .	44	29.893	+0.015	29.869	30.069	29.661	.408	.162	75.1	86.3	+0.3	72.0	-0.5	79.2	-0.1	14.3	93.3	58.5	34.8	21.7		
23	MALABAR . . .	Cochin . . .	11	29.942	+0.009	29.880	30.072	29.812	.260	.140	78.5	88.2	+1.2	74.7	+0.2	81.5	+0.7	13.5	94.5	66.3	28.2	20.3		
		Calicut . . .	27	29.920	+0.006	29.876	30.061	29.783	.278	.153	78.1	86.9	+0.1	73.3	-0.5	80.1	-0.2	13.6	93.3	63.0	30.3	19.4		
		Mangalore . .	65	29.884	+0.012	29.881	30.019	29.717	.302	.150	78.3	87.0	+0.4	73.8	-0.2	80.4	+0.1	13.2	93.8	62.5	31.3	20.5		
		Trivandrum .	198	29.746		29.876	29.864	29.595	.269	.143	77.5	83.6		74.8		79.3		8.8	100.0	65.0	35.0	16.2		
XI.—South India.				...	+0.011	...	...	...	...	...	90.2	+1.0	71.2	+0.1	80.7	+0.6	19.0				45.0	29.0
57	MADRAS, SOUTH	Pamban . . .	37	29.888		29.852	30.066	29.720	.346	.149	81.5	87.7		75.3		81.5		12.4	94.3	69.2	25.1	17.6		
		Tinnevely . . .	163	29.769		29.867	29.954	29.577	.377	.150	81.2	93.6		76.0		84.8		17.7	103.4	65.9	37.5	27.6		
		Madura . . .	447	29.476	+0.009	29.861	29.662	29.292	.370	.149	80.4	93.3	-0.9	73.6	0	83.5	-0.5	19.7	102.0	63.7	38.3	28.7		
34	MADRAS, CENTRAL, SOUTH	Salem . . .	940	29.013	+0.007	29.901	29.192	28.836	.356	.144	77.8	93.5	+0.8	70.5	+0.3	82.0	+0.6	23.0	101.9	56.0	45.9	32.9		
		Coimbatore . .	1,348	28.588	+0.013	29.892	28.761	28.431	.330	.139	75.6	90.7	+0.5	69.2	-0.4	80.0	+0.1	21.5	99.9	56.7	43.2	31.0		
25	COORG . . .	Mercara . . .	3,781	26.229	†		26.256	26.100	.256	.130	65.3	76.5	+0.2	61.4	+0.4	69.0	+0.3	15.1	88.5	49.3	39.2	23.6		
25	MYSORE . . .	Chitaldroog .	2,405	27.536		29.872	27.709	27.325	.284	.151	73.5	87.3		67.0		77.2		20.3	98.2	53.9	44.3	29.3		
		Bangalore . .	3,021	26.954	+0.005	29.890	27.109	26.771	.338	.141	69.9	84.8	+1.0	63.4	-0.4	74.2	+0.3	21.4	94.8	50.9	43.9	30.9		
		Hassan . . .	3,091	26.896		29.903	27.039	26.713	.326	.135	70.8	83.1		61.2		72.2		21.9	93.9	45.9	48.0	31.2		
		Mysore . . .	2,518	27.450		29.903	27.604	27.288	.316	.141	71.8	86.7		64.6		75.7		22.1	96.9	51.9	45.0	31.4		

* Mean of 11 months.

† Mean of 10 months.

I—contd.

at 214 stations in India, Burma, etc., in the year 1899—contd.

WIND DIRECTION.									WIND VELOCITY.			HYGROMETRY 8 A.M.		Mean cloud amount of year.	RAINFALL.					Heaviest rainfall during year.	STATION.	METEOROLOGICAL PROVINCE OR DISTRICT.	Number of District.						
Number of winds from									Mean velocity in miles per hour.	Normal.	Percentage variation.	Mean humidity of year.	Mean vapour tension of year.		Number of rainy days during year.	Normal number of rainy days during year.	Variation.	Rainfall of year.	Normal rainfall of year.					Variation from normal.					
Calm.	N.	N.E.	E.	S.E.	S.	S.W.	W.	N.W.																					
9	8	5	6	5	7	42	201	58	13.7	7.2	+90	57	.581	2.4	17	40.57	-23.57	8.07	25.60	-17.53	2.10	Malegaon.	KHANDESH.		40				
63	60	16	9	27	8	15	89	78	16.3			57	.493	2.4	23			11.65	25.55	-13.90	1.64	Ahmednagar.							
59	6	16	24	51	12	28	74	95	7.6	5.5	+38	46	.442	3.1	26	50.58	-24.58	12.08	37.90	-25.82	2.12	Akola . . .				BERAR.		41	
	33	22	47	42	53	54	87	27	7.4	4.7	+57	53	.515	3.2	26	50.99	-24.99	14.68	37.41	-22.73	1.78	Amraoti.							
105	5	22	13	8	7	17	125	63	6.8	5.4	+26	47	.431	2.5	19	44.36	-25.36	8.88	33.29	-24.41	1.59	Khandwa . . .				CENTRAL WEST.	PROVINCES,	42	
132	5	75	9	4	3	115	4	17	1.5	3.0	-50	69	.613	1.8	28	60.53	-32.53	23.14	56.58	-33.44	3.20	Hoshangabad.							
176	36	21	11	5	8	21	54	33	6.2	6.4	-3	51	.487	3.7	35	64.93	-29.93	14.36	50.91	-36.55	1.46	Nagpur.				CENTRAL CENTRAL.	PROVINCES,	43	
113	23	22	32	17	16	26	95	21	3.3	3.7	-11	59	.556	3.8	35			22.73	58.53	-35.80	2.93	Chanda . . .							
1	53	80	12	28	12	59	47	73	2.4	3.9	-38	54	.458	2.6	46	73.65	-27.65	21.44	58.89	-31.45	2.03	Seoni.							
26	12	13	11	56	87	54	83	23	2.5	3.3	-24	60	.481	2.5	35	65.62	-30.62	35.10	60.37	-25.27	4.93	Jubbulpore.							
12	23	24	33	41	40	45	127	20	5.9	3.5	+69	53	.488	2.4	32	56.93	-24.93	23.32	48.93	-25.61	3.61	Saugor.							
33	60	11	16	6	14	51	103	71	6.5	6.1	+7	54	.470	2.4	43	52.91	-9.91	20.56	46.48	-19.92	2.58	Sutna . . .	CENTRAL INDIA.		49				
183	6	17	10	8	14	80	22	7	3.9	5.6	-30	55	.513	3.5	38	65.61	-27.61	27.12	52.52	-25.40	2.28	Raipur . . .							CENTRAL PROVINCES, EAST.		41
2	85	74	29	22	20	51	40	40	3.1	2.3	+35	66	.623	4.0	62			48.25	68.05	-19.80	5.88	Sambalpur.	HYDERABAD, NORTH		39				
137	19	1	10	9	11	28	97	53	6.4			64	.625	3.7	38			19.49	37.40	-17.91	2.20	Indur.							
	54	21	23	35	32	97	69	34	8.2			71	.645	2.2	37			18.95	42.04	-23.09	3.05	Bidar.							HYDERABAD, SOUTH.		53
96	39	46	31	11	12	26	39	65	9.9*			57*	.523*	2.9	29			14.75	29.19	-14.44	1.67	Gulbarga . . .							
24	14	8	28	68	18	94	59	52	10.4			61	.575	1.8	24			12.12	28.22	-16.10	2.96	Raichur.							
160	7	1	17	22	4	1	119	31	4.9			63	.554	2.9	31			17.92	33.72	-15.80	3.48	Hyderabad (Dn).							
38	2	33	77	26	1	32	84	72	7.1	6.5	+9	61	.526	2.8	26			16.29	33.72	-17.43	1.89	Secunderabad.							
78	14		11	81	45	27	81	28	8.8			64	.622	3.2	32			16.96			2.93	Hanumkonda.							
																			69.32 103.13 -33.81			X.—West Coast.							
1	38	78	78	29	12	39	70	20	9.8	12.2	-20	76	.759	3.8	54	76.65	-22.65	35.90	74.12	-38.22	6.48	Bombay . . .	KONKAN.		37				
67	21	22	43	78	16	27	54	37	5.7	10.2	-44	72	.712	3.7	64	97.80	-33.80	61.16	111.65	-50.49	8.67	Ratnagiri.							
18	67	13	53	77	16	24	11	86	8.7			83	.811	4.0	82			60.40	91.80	-31.40	3.27	Mormugao.							
21	32	55	128	11	10	26	52	29	?			81	.788	4.6	77			56.90	103.32	-46.42	3.07	Goa.							
44	78	79	69	2	2	36	43	12	4.3			82	.724	3.4	88	109.07	-21.07	72.44	129.19	-56.75	3.46	Karwar.	MALABAR.		33				
22	139	114	9	11	10	8	21	31	5.0			79	.798	4.3	111	132.16	-21.16	94.19	116.52	-22.33	4.15	Cochin . . .							
113	28	43	79	30	9	4	10	49	9.0			82	.790	4.7	100	113.90	-13.90	97.94	113.13	-15.19	5.64	Calicut.							
152	11	18	77	49	5	4	22	27	2.4	3.4	-29	79	.772	6.5	97	118.30	-21.30	89.36	122.74	-33.38	5.58	Mangalore.							
87	103	22	28	10	2	1	15	97	5.7			81	.766	5.5	73			55.63	65.70	-10.07	5.53	Trivandrum.							
																			30.65 40.58 -9.93			XI.—South India.							
16	29	75	27	52	30	83	28	25	9.6			79	.852	2.9	47	33.10	+13.90	34.79	37.00	-2.21	2.12	Pamban . . .	MADRAS (SOUTH).		57				
	73	28	1	2	3	14	76	168	5.9			66	.710	4.5	35	43.00	-8.00	25.85	28.78	-2.93	3.08	Tinnevely.							
24	99	57	8	16	1	14	22	124	4.4	4.2	+5	70	.725	4.1	38	43.71	-5.71	22.25	32.69	-10.44	2.09	Madura.				MADRAS CENTRAL).	(South	3	
94	5	55	42	3	15	102	38	11	4.5	4.4	+2	73	.706	3.7	43	66.50	-23.50	28.29	41.44	-13.15	4.49	Salem . . .							
	1	41	116	12	47	72	73	3	3.3	4.8	-31	77	.690	5.6	34	45.20	-11.20	19.26	21.24	-1.98	2.86	Coimbatore.	COORG.		35				
77	50	36	59	3	6	9	81	44	8.0	5.8	+38	83	.523	5.2	101	137.20	-36.20	91.12	129.37	-38.25	7.20	Mercara . . .							
13	4	4	51	50	10	91	110	32	9.0			68	.561	4.6	37			15.65	25.43	-9.78	1.95	Chitaldroog.				MYSORE.		36	
6	3	38	77	24	18	70	113	16	8.6	5.2	+65	75	.559	4.5	49	61.68	-12.68	25.42	35.86	-10.44	1.81	Bangalore.							
4	7	44	66	46	9	47	83	59	3.5			72	.547	5.2	53			27.31	30.47	-3.16	2.87	Hassan.							
6	13	63	37	13	19	98	97	19	10.0			74	.574	5.9	37			20.08	29.04	-8.96	2.08	Mysore.							

§ Wind observation of 341 days.

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Table

Abstract of observations taken at 8 A. M.

Number of Districts	METEOROLOGICAL PROVINCE OR DISTRICT.	STATION.	Elevation of Bar Cistern above sea level in feet.	PRESSURE 8 A.M. IN INCHES.							TEMPERATURE OF AIR.											
				Mean actual pressure (reduced to 32°).	Variation from normal.	Mean pressure reduced to sea level and to constant gravity 45° Lat.	Highest pressure recorded during year.	Lowest pressure recorded during year.	Absolute range during year.	Mean monthly range of pressure.	Mean of 8 A.M. of year.	Mean maximum of year.	Variation from normal of year.	Mean minimum of year.	Variation from normal of year.	Mean daily temperature of year.	Variation from normal of year.	Mean daily range of temperature.	Highest temperature observed during year.	Lowest temperature observed during year.	Absolute range during year.	Mean monthly absolute range.
56	MADRAS, EAST-COAST, SOUTH.	Negapatam . .	31	29'889	+006	29'841	30'088	29'698	'390	'170	8'16*	91'8*	+1'9*	76'5*	+0'8*	84'2*	+1'3*	15'3*	104'5	66'0	38'5	25'5*
		Cuddalore . .	12	29'908		29'849	30'118	29'697	'421	'158	79'8	90'3		71'5		80'9		18'8	103'3	61'3	42'0	29'5
		Trichinopoly . .	255	29'671	+004	29'861	29'867	29'465	'402	'152	79'5	91'3	+0'4	73'9	+0'2	84'1	+0'3	20'4	103'6	62'4	41'2	30'0
		Madras . .	22	29'898	+006	29'851	30'126	29'667	'459	'166	81'0	91'4	+0'6	74'6	-0'1	83'0	+0'3	16'8	104'0	60'0	44'0	21'5
55	MADRAS, EAST-COAST, CENTRAL.	Nellore . .	71	29'831		29'836	30'071	29'582	'489	'177	81'4	95'6		75'0		85'3		20'7	109'4	59'1	50'3	31'3
		Masulipatam . .	15	29'890	+020	29'839	30'150	29'611	'539	'184	81'4	91'5	+1'2	74'5	+0'3	83'0	+0'8	17'0	110'2	59'7	50'5	28'3
54	MADRAS, CENTRAL.	Cuddapah . .	433	29'484	+010	29'859	29'702	29'252	'450	'161	81'2	96'7	+2'2	74'2	0	85'5	+1'1	22'5	109'3	56'3	53'0	33'4
		Kurnool . .	923	28'982	+008	28'859	29'214	28'744	'470	'165	76'5	95'2	+2'1	70'2	-0'3	82'7	+0'9	25'1	108'3	47'7	60'6	36'6
		Bellary . .	1,475	28'445	+017	28'873	28'647	28'215	'432	'162	77'2	93'9	+0'9	70'5	+0'1	82'2	+0'5	23'4	106'7	52'6	54'1	33'7
52	MADRAS, EAST-COAST, NORTH.	Cocanada . .	26	29'869	+024	29'830	30'146	29'558	'588	'200	80'0	91'2	+2'0	75'1	+0'3	83'2	+1'2	16'1	110'5	58'5	52'0	28'3
		Waltair . .	226	?		?					80'5	87'9		75'3		81'6	0	12'6	101'6	59'6	542'0	23'8
		Gopalpur . .	21	29'843		29'804	30'194	29'454	'740	'228	77'7	86'7		72'3		79'5	0	14'4	102'3	50'1	02'2	26'0
XII.—Hill Stations.				...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
48	BALUCHISTAN . .	Shahrig . .		25'724			26'050	25'360	'690	'275	67'9	83'5		54'9		69'2		28'6	110'0	20'0	90'0	48'5
		Pishin . .					Not recorded.					78'7		42'3		60'5		36'4	105'4	2'4	103'0	56'5
		Quetta . .	5,502	24'633	+018		24'863	24'343	'520	'229	56'5	75'0	+1'7	44'3	-0'3	59'6	+0'7	30'7	99'1	10'8	88'3	49'1
		Kalat . .					Not recorded.				56'6	74'5		37'0		55'7		37'5	103'0	4'0	99'0	58'4
		Chaman . .	4,311	25'711			25'923	25'375	'548	'240	64'9	80'1		55'8		68'0		24'3	108'2	18'1	90'1	44'6
20	PUNJAB . .	Leh . .	11,503	19'726	+028		19'968	19'492	'476	'280	36'3	53'5	-3'4	28'0	-1'9	40'8	-2'7	25'5	86'2	-19'0	105'2	43'9
		Srinagar . .	5,204	24'899			25'182	24'509	'673	'290	49'4	66'6		44'1		55'4		22'5	95'4	12'1	83'3	40'7
		Skardu . .		22'876			23'186	22'516	'670	'351	46'2	62'4		40'1		51'2		22'3	96'1	-2'0	98'1	43'1
		Dras . .		20'781			21'037	20'499	'538	'307	32'8	52'7		18'6		35'7		34'1	91'5	-35'5	127'0	58'7
		Gilgit . .		25'137			25'551	24'645	'906	'422	59'2	73'0		53'5		62'3		19'5	111'0	22'1	88'9	38'6
		Chitral . .		24'658			24'915	24'200	'715	'278	54'5	72'9		47'8		60'4		25'1	107'2	18'0	89'2	43'1
		Killa Drosh . .					Not recorded.				56'5	73'2		52'0		62'7		21'1	105'0	25'0	80'0	39'7
		Para Chinari . .	6,000								59'0	72'0		49'6		60'8		22'4	100'1	16'3	83'8	39'4
		Cherat . .		25'667			25'957	25'329	'628	'274	63'3	75'1		57'2		66'2		17'9	105'0	29'6	75'4	35'9
		Murree . .	6,333	23'815	-003		24'055	23'568	'487	'210	57'2	66'1	+0'3	51'6	+0'8	58'9	+0'6	14'5	92'9	22'0	70'9	33'4
		Poo . .					Not recorded.					62'4		41'6		52'0		20'9	89'0	13'9	75'1	36'9
		Simla . .	7,224	23'102	+010		23'331	22'862	'469	'213	53'7	61'6	+0'1	50'1	+0'1	56'0	+0'1	11'5	82'8	22'2	60'6	24'3
25	NORTH-WESTERN PROVINCES.	Chakrata . .	7,022	23'272	+018		23'509	23'022	'487	'214	54'6	64'6	+0'4	49'7	+0'2	57'2	+0'3	14'9	81'8	21'3	60'5	28'7
		Mussooree . .	6,705	23'533			23'774	23'272	'502	'224	55'9	64'0		51'4		57'7		42'6	86'8	25'0	61'8	25'5
		Ranikhet . .	6,069	24'086	+014		24'389	23'824	'565	'217	58'1	68'5	+0'8	53'9	+0'8	61'2	+0'8	14'6	89'1	27'0	62'1	28'0
		Muktesar . .		22'835			23'057	22'612	'445	'209	54'3	64'9		48'4		56'7		16'5	85'6	22'5	63'1	30'1
13	BENGAL . .	Yatung . .	10,480?				Not recorded					53'3		35'3		44'3		18'1	69'1	10'9	58'2	31'3
		Darjeeling . .	7,409	22'969	+001		23'184	22'795	'389	'201	51'3	59'3	0	48'0	0	53'7	0	11'3	73'2	26'3	46'9	22'0
		Gantok* . .	5,660	24'479			24'706	24'256	'450	'205	57'2	67'4		39'1		53'3		28'3	81'6	19'2	62'4	39'2
	CENTRAL INDIA . .	Mount Abu . .	3,945	26'032	+001		26'245	25'731	'514	'207	68'3	77'5	+1'2	6'29	+1'1	70'2	+1'2	14'5	93'2	37'5	55'7	26'7
		Pachmarhi . .	3,523	26'443	+017		26'666	26'117	'549	'205	69'7	81'4	+2'3	61'1	+0'2	71'3	+1'3	20'3	100'2	30'3	69'9	34'4
	SOUTH INDIA . .	Wellington . .	6,200	24'249	-010		24'363	24'115	'248	'117	61'8	72'2	+1'6	51'9	-1'7	62'1	-0'1	20'3	79'7	36'2	43'5	21'2

* Mean of 11 months.

I—contd.

at 214 stations in India, Burma, etc., in the year 1899—contd.

WIND DIRECTION.									WIND VELOCITY.				HYGROMETRY S.A.M.		RAINFALL.							Heaviest rainfall during year.	STATION.	METEOROLOGICAL PROVINCE OR DISTRICT.	Number of District.
Number of winds from									Mean velocity in miles per hour.	Normal.	Percentage variation.	Mean humidity of year.	Mean vapour tension of year.	Mean cloud amount of year.	Number of rainy days during year.	Normal number of rainy days during year.	Variation.	Rainfall of year.	Normal rainfall of year.	Variation from normal.					
Calm.	N.	N.E.	E.	S.E.	S.	S.W.	W.	N.W.																	
47	26	48	3	13	26	83	79	40	11.4	5.6	+109	74*	.793*	4.8	46	60.74	-14.74	65.23	54.66	+10.57	10.59	Negapatam .	MADRAS, EAST-COAST, SOUTH.	56	
	51	5	3	11	63	55	99	78	2.1			82	.820	2.4	54	56.80	-2.80	51.36	47.34	+4.02	4.52	Cuddalore.			
144	33	13	2	2	1	36	109	25	6.0	5.8	+3	73	.726	4.3	32	45.45	-13.45	26.27	32.69	-6.42	4.33	Trichinopoly.			
5	51	30	18	11	66	61	85	38	6.3	7.1	-11	74	.778	4.6	40	60.53	-20.53	41.00	49.02	-8.02	4.26	Madras.			
131	2			27	26	3	86	90	6.6			74	.790	5.5	31	44.30	-13.30	26.98	35.63	-8.65	4.61	Nellore .	MADRAS, EAST-COAST, CENTRAL.	55	
62	76	24	6	24	38	25	54	56	7.8	7.0	+11	80	.841	4.4	36	55.24	-19.24	23.53	43.54	-20.01	4.05	Masulipatam.			
	2	47	37	79	16	47	73	64				66	.694	3.5	31	46.00	-15.00	17.54	34.18	-16.64	2.54	Cuddapah .		MADRAS, CENTRAL.	54
199	11	1	10	8	7	4	100	25				61	.561	3.7	29	48.93	-19.93	14.49	30.06	-15.57	2.31	Kurnool.			
79	1	3	6	66	24	11	97	78	7.4	6.5	+14	51	.477	5.0	26	35.00	-9.00	15.64	19.73	-4.09	1.78	Bellary.			
12	69	42	6	7	14	71	95	49	7.6			70	.721	4.0	27	55.10	-28.10	16.06	44.54	-28.48	1.66	Cocanada.	MADRAS, EAST-COAST, NORTH.	52	
19	11	34	13	12	6	84	103	45	11.8*			72	.764	4.7								Waltair† .			
20	96	2	3	1	30	117	16	80	12.7	9.6	+32	80	.776	1.7	47	61.35	-14.35	35.57	49.41	-13.84	4.89	Gopalpur.			
...	XII.—Hill Stations.		
79	11	4	4	38	4	81	55	88	5.4			44	.335	1.4	12			7.67	14.60	-6.93	2.25	Shahrig .	BALUCHISTAN.	48	
															13			5.95	10.61	-4.66	1.07	Pishin.			
320	2		2	9	14	5	8	5	2.5	4.1	-40	60	.288	2.0	20	22.45	-2.45	7.33	10.89	-3.56	0.98	Quetta.			
	7		43	3	230	14	24	41				48	.213	?	13			3.52	8.53	-5.01	0.48	Kalat.			
	9	7	79	100	62	73	21	14	8.3			54	.361	1.3	17			5.26	7.43	-2.17	1.03	Chaman.			
2	13	41	24	6	83	59	73	64	2.1			54	.139	4.6	10			3.00	3.17	-0.17	0.55	Leh .	PUNJAB.	30	
136	14	16	22	72	57	8	13	27	5.0			87	.358	4.7	57			19.92	35.24	-15.32	1.60	Srinagar			
235	3	42	3		6	20	52	4	4.2			76	.261	4.3	17			5.40	13.32	-7.92	0.56	Skardu.			
329	4	3	5	5	3	5	7	4	3.8			74	.179	4.3	50			21.21	24.25	-3.04	1.38	Dras.			
300			3	2		26	30	3	1.8			47	.250	5.2	13			3.78	4.08	-0.30	0.54	Gilgit.			
307	7	2	1	2	10	4	2	7	3.5			62	.287	3.3†	34			15.65			1.50	Chitral.			
138	9	5	94	16	23	19	61					54	.260	3.3	33			13.06			0.98	Killa Droesh.			
	73	63	18	24	8	33	34	112	4.8			51	.264	3.6	46			19.83			2.00	Para Chinar.			
34	150	17	2	17	60	8	9	68	14.3			50	.318	2.8	25			15.33	26.16	-10.83	2.89	Cherat.			
130	49	7	26	77	46	1	2	27	?	6.8	?	50	.255	2.4	57	67.56	-10.56	37.92	56.29	-18.37	2.21	Murree			
														3.7	13			5.47	18.56	-13.09	0.85	Poo.			
90	103	79	18	13	41	13	2	3	4.3	2.2	+95	54	.245	3.6	69	84.52	-15.52	42.58	64.1	-21.61	3.66	Simla.			
203	128	4		3	28	2		1	10.2	5.1	+100	57	.269	2.9	75			62.48	67.76	-5.28	5.06	Chakrata .	NORTH-WESTERN PROVINCES.	25	
1	40	31	50	14	9	10	70	140				58	.288	3.3	79	79.73	-0.73	66.26	97.95	-31.69	4.95	Mussooree.			
151	7	23	17	18	17	77	30	25	3.2	2.1	+52	58	.323	3.3	59	77.29	-18.29	38.16	54.44	-16.28	2.20	Ranikhet.			
47	13	6	31	68	11	10	23	156	5.1			57	.258	3.8	70			43.20			3.08	Muktesar.			
														147				53.28			3.55	Yatung .	BENGAL.	13	
153	3	40	63	46	7	13	22	8	3.6	3.4	+6	88	.360	5.5	133	125.43	+7.57	156.87	121.69	+35.18	19.40	Darjeeling.			
319	1	9		1		1			2.5			82	.412	4.2	183			144.58	143.89	+0.69	2.84	Gantok.‡			
85	28	54	2	8	8	154	47	29	9.4	7.0	+34	49	.335	2.5	20	53.19	-33.19	11.42	66.87	-55.45	2.52	Mount Abu .	CENTRAL INDIA.		
178	13	8	6	6	9	18	56	69	7.7	5.2	+48	58	.426	3.4	48	80.37	-32.37	39.47	73.23	-38.76	6.10	Pachmarhi.			
219	32	36	12	10	17	29	6	4	3.1	3.3	-6	64	.359	3.9	64	88.33	-24.33	39.38	52.98	-13.60	2.16	Wellington .		SOUTH INDIA.	

* Mean of 10 months.

† Wind observations of 327 days.

‡ Wind observations of 331 days.

Table

Abstract of observations taken at 8 A.M.

METEOROLOGICAL PROVINCE OR DISTRICT.	STATION.	Elevation of Bar Cistern above sea level in feet.	PRESSURE 8 A.M. IN INCHES.							TEMPERATURE OF AIR.											
			Mean actual pres- sure (reduced to 32°).	Variation from normal.	Mean pressure reduced to sea level and to con- stant gravity 45° Lat.	Highest pressure recorded during year.	Lowest pressure recorded during year.	Absolute range during year.	Mean monthly range of pres- sure.	Mean of 8 A.M. of year.	Mean maximum of year.	Variation from normal of year.	Mean minimum of year.	Variation from normal of year.	Mean daily tem- perature of year.	Variation from normal of year.	Mean daily range of temperature.	Highest temper- ature observed during year.	Lowest temper- ature observed during year.	Absolute range during year.	Mean monthly absolute range.
XIII.—Extra India.																					
CEYLON . . .	Trincomalee . .	12	29'900		29'838	30'058	29'721	'337	'152	79'9	88'3		76'1		82'2		12'2	97'0	69'0	28'0	20'0
	Colombo . . .	40	29'912	+ '004	29'878	30'034	29'782	'252	'140	80'5	88'5		75'3		81'9		13'2	100'0	64'0	36'0	20'9
PERSIA . . .	Meshed . . .	3,104			Not recorded.					57'3*			47'0						-2'6		
	Teheran . . .		25'989			26'500	25'540	'960	'453	61'1	74'5		51'8		63'2		22'7	107'8	14'0	93'8	42'5
	Ispahan . . .		24'354			24'680	24'050	'630	'335	57'6	75'2		45'7		60'5		29'6	104'0	12'4	91'6	41'0
	Bushire . . .	14	29'878	+ '019	29'850	30'302	29'396	'906	'316	74'5	81'9	-0'6	69'0	+0'7	75'7	0	13'0	115'0	93'3	71'7	31'2
	Jask . . .		29'871			30'353	29'385	'968	'289	79'0	87'2		73'9		80'5		13'3	104'7	53'3	51'4	24'9
ARABIA . . .	Muscat . . .	20	29'870		29'837	30'224	29'410	'814	'271	81'5	84'1		79'2		81'7		4'9	106'8	62'9	43'9	14'6
	Baghdad . . .	221	29'795	+ '003	29'996	30'269	29'287	'982	'378	67'5	86'7	+1'0	60'1	+1'1	73'4	+1'1	26'6	118'9	29'5	89'4	46'4
	Aden . . .	94	29'846	+ '015	29'872	30'065	29'570	'495	'173	81'6	87'6	-1'2	78'0	+0'6	82'8	-0'3	9'6	97'8	68'9	28'9	18'8
	Perim . . .	201	29'700			29'914	29'443	'471	'176	82'5	90'1*		79'7*		84'9*		10'4*	101'1	71'4	29'7	17'6*
AFGHANISTAN . .	Kabul . . .				Not recorded.					51'3	74'1		42'2		58'2		31'8	99'1	4'0	95'1	51'8
CENTRAL ASIA . .	Kashgar . . .		25'628			26'030	25'110	'920	'512	50'5	67'4		43'6		55'5		23'8	100'1	9'3	90'8	45'6
ARABIAN ISLANDS.	Amiri Devi . .	13	29'951			30'089	29'784	'305	'162		87'6		76'9		82'3		10'7	93'5	67'4	26'1	18'5
	Minicoy . . .	7	29'902		29'837	30'036	29'759	'277	'143	82'0	86'1							91'6			
AFRICA . . .	Zanzibar . . .	73	30'003	+ '009*	30'004	30'179	29'814	'365	'135	78'2	83'3		76'1		79'7		7'1	89'1	68'9	20'2	12'5
	Do. Dunga . .					Not recorded.				78'0	87'7		70'7		79'2		17'0	98'6	61'6	37'0	25'3

* Mean of 11 months.

Note.—When a query is inserted against any reading or in the variation returns for any station

I—concl'd.

at 214 stations in India, Burma, etc., in the year 1899—concl'd.

WIND DIRECTION.									WIND VELOCITY.			HYGROMET- RY 8 A.M.		Mean cloud amount of year.	RAINFALL.						Heaviest rainfall during year.	STATION.	METEOROLOGICAL PROVINCE OR DISTRICT.	
Number of winds from									Mean velocity in miles per hour.	Normal.	Percentage variations.	Mean humidity of year.	Mean vapour tension of year.		Number of rainy days during year.	Normal number of rainy days during year.	Variation.	Rainfall of year.	Normal rainfall of year.	Variation from normal.				
Calm.	N.	N.E.	E.	S.E.	S.	S.W.	W.	N.W.																
...
48	5	61	2		1	227	16	5	7.5*			83	.854	2.7	74			61.93	75.24	-13.31	8.05	Trincomalee . . .	CEYLON.	
	47	52	33	37	26	110	55	5	8.6	7.6	+13	82	.853	4.9	77			73.82	90.04	-16.22	5.55	Colombo.		
												60	.283	?	25			10.13	7.88	+2.25	0.98	Mesched . . .		PERSIA
169	28	24	6	1	9	22	6	6	3.2			43†	.258†	2.5	18			7.54	9.76	-2.22	0.82	Teheran.		
150	9	8	14	6	6	60	65	47	4.0			62	.321	2.3	12			4.03	4.69	-0.66	0.62	Ispahan.		
9	69	76	60	52	13	10	10	64	8.2			68	.594	2.1	17			8.65			1.85	Bushire.		
1	44	65	107	55	3	5	13	67	11.9			72	.735	1.9	8			4.78			2.32	Jask.†		
74	19	14	11	74	6	28	36	103	4.7			65	.710	2.0	4			1.87	6.14	-4.27	0.93	Muscat . . .	ARABIA.	
127	90	17	8	7	17	4	14	72	3.6			55	.356	2.0	11			3.68	10.62	-6.94	0.69	Baghdad.†		
43	4	74	140	35	29	33	4	3	13.3	11.5	+16	71	.761	4.9	2			1.36	3.79	-2.43	0.90	Aden.		
32	10	52	125	56	33	22	27	8	14.7*			73	.818	4.3	6			3.68	1.71	+1.97	2.20	Perim.		
198	14	8	3	1	9	29	65	36						1.5	22			7.10	11.44	-4.34	1.00	Kabul . . .	AFGHANISTAN.	
231	33	8	12	2	7	1	57	9	2.5*					4.2	8			2.26	4.41	-2.15	0.70	Kashgar † . . .		CENTRAL ASIA.
26	91	30	9	4	9	25	87	84						4.7	44			38.76			4.19	Amini Devi . . .			ARABIAN SEA ISLAND.
	79	54	17	15	8	22	82	88	7.9			77	.839	3.6	92			64.63			3.72	Minicoy.		
1	39	48	24	39	145	64	4	1	6.3			81	.782	6.7	82			66.69	55.30	+11.39	9.30	Zanzibar . . .	AFRICA	
20	32	78	18	32	34	122	14	10	7.2			83	.794	6.3	105			94.96			10.18	Do. Dunga.		

† Mean of 10 months.

† Wind variations of 360 days.
Do. 356 "

The data for that station are not utilized in calculating the provincial variation.

Table

Abstract of Observations recorded at 10 A.M. and 4 P.M.

METEOROLOGICAL PROVINCE.	STATION.	Elevation of bar-cistern above sea level in feet.	PRESSURE.						TEMPERATURE OF AIR.									
			Mean of 10 hours.	Mean of 16 hours.	Mean daily range.	Mean daily pressure.	Variation from normal.	Mean reduced to S. L. and for gravity 45° Lat.	Mean maximum.	Mean minimum.	Mean daily range.	Highest maximum.	Lowest minimum.	Absolute range.	Mean 10 hours.	Mean 16 hours.	Mean daily.	Variation from normal.
BURMA COAST AND BAY ISLANDS.	Port Blair . . .	111	29'877	29'780	'097	29'826	+018	29'817	87'2	77'2	10'0	95'4	69'4	26'0	83'6	81'7	81'1	+0'4
	Rangoon . . .		'884	'763	'121	'827	-003	'801	89'2	72'2	17'0	102'5	58'2	44'3	81'8	85'4	78'7	-0'2
	Diamond Island . .		'888	'788	'100	'835	0	'812	85'1	77'0	8'1	91'1	69'2	21'9	82'1	82'2	79'9	+1'0
	Cocos Island . . .		'803	'713	'090	'756	-001	'798	86'4	77'4	9'0	96'8	70'4	26'4	83'2	83'2	80'3	+1'3
	Akyab . . .		'884	'776	'108	'830	-006	'793	85'4	73'3*	12'1	95'3	52'8	42'5	79'8	82'2	79'0*	+0'2
BENGAL AND ORISSA .	Chittagong . . .		'800	'692	'108	'743	-015	'778	84'3	69'0	15'3	94'9	46'8	48'1	79'4	81'7	76'1	-0'2
	Calcutta (Alipore) .		'846	'733	'113	'787	+002	'753	87'7	70'3	17'4	105'4	44'4	61'0	81'4	85'3	78'5	+0'6
	Saugor Island . . .		'840	'733	'107	'784	+002	'753	85'6	73'3	12'3	96'1	45'9	50'2	81'4	83'0	78'3	0
	False Point . . .		'851	'746	'105	'799	-005	'762	86'0	71'7	14'3	101'0	45'9	55'1	82'7	83'3	77'7	0
	Hazaribagh . . .		27'845	27'747	'098	27'796	+001	'738	85'4	65'9	19'5	108'1	40'3	67'8	78'5	82'3	74'7	+0'6
GANGETIC PLAIN AND CHOTA NAGPUR.	Darbhanga . . .		29'690	29'568	'122	29'627	-006	'748	85'3	68'7	16'6	105'1	44'2	61'9	79'0	83'8	76'3	-0'3
	Allahabad . . .		'537	'424	'113	'476	-003	'738	90'4	66'2	24'2	113'1	36'5	76'6	82'4	89'1	77'6	-0'2
	Dehra Dun . . .		27'614	27'526	'088	27'561	-010	'751	82'6	60'5	22'1	104'6	35'1	69'5	74'1	78'4	70'3	-0'3
UPPER SUB-HIMALAYAS.	Roorkee . . .		28'939	28'831	'108	28'877	-007	'730	88'5	61'8	26'7	112'3	32'7	79'6	78'3	86'1	74'3	+0'2
	Meerut . . .		29'085	'981	'104	29'025	-014	'728	90'2	64'4	25'8	111'5	35'8	75'7	79'2	87'1	76'4	+1'4
	Lahore . . .		'115	29'019	'096	'059	-014	'729	90'5	65'2	25'3	114'5	32'0	82'5	79'7	89'8	77'2	+3'6
	Lahore (Newshed) .								92'5	63'8	28'7	117'3	29'9	87'4	81'9	90'2	77'1	
	Ludhiana . . .		'010	28'912	'098	28'954	-008	'733	89'6	65'1	24'5	113'9	34'6	79'3	79'3	87'5	76'4	+2'4
INDUS VALLEY AND N.-W. RAJPUTANA.	Peshawar . . .		28'729	'626	'103	'670	-022	'763	87'3	60'6	26'7	115'5	28'9	86'6	78'4	84'6	72'8	+1'9
	Jacobabad . . .		29'641	29'516	'125	29'571	-012	'713	98'4	65'5	32'9	123'2	31'8	91'4	85'3	96'2	80'9	+1'9
	Kurrachee . . .		'858	'763	'095	'809	+005	'789	89'3	70'4	18'9	111'4	40'6	70'8	83'3	84'9	78'4	+1'0
	Jaipur . . .		28'441	28'336	'105	28'383	+006	'757	93'1	66'9	26'2	112'7	35'7	77'0	84'1	90'8	78'9	+2'8
EASTERN RAJPUTANA, CENTRAL INDIA AND GUJARAT.	Udaipur . . .		27'964	27'857	'107	27'911		'767	90'5	65'9	24'6	108'0	34'8	73'2	82'4	88'2	77'6	
	Deesa . . .		29'420	29'296	'124	29'354	+003	'767	96'1†	68'7	27'4	113'3	38'4	74'9	86'6	95'3	81'9†	+2'9
DECCAN . . .	Belgaum . . .		27'388	27'285	'103	27'336	+008	'775	84'5	63'4	21'1	100'6	47'8	52'8	78'2	81'3	72'8	+0'1
	Sholapur . . .		28'325	28'185	'140	28'257	+009	'766	95'0	68'9	26'1	109'7	49'2	60'5	81'6	92'3	80'9	+1'7
	Poona . . .		'083	27'970	'113	'030	+017	'789	91'5	63'8	27'7	105'0	43'5	61'5	82'2	88'4	76'8	+0'9
	Akola . . .		'965	28'823	'142	'891	+011	'760	96'4	67'7	28'7	112'7	39'5	73'2	86'7	94'6	81'7	+2'5
	Buldana . . .		27'777	27'659	'118	27'715	+012	'754	90'8	68'5	22'3	106'7	47'1	59'6	82'5	88'5	79'2	+2'1
	Khandwa . . .	2,132	28'851	28'719	'132	28'782	+018	'767	95'3	67'8	27'5	110'7	36'2	74'5	85'2	94'0	81'0	+2'8
	Nagpur . . .		'855	'723	'132	'786	+020	'753	95'1	69'4	25'7	114'2	40'4	73'8	84'6	92'0	81'6	+2'9
	Nagpur (Sanitary Commr.'s Office.)		'873	'742	'131	'805		'761	96'2	68'8	27'4	116'1	41'7	74'4	86'0	93'4	81'8	
	Hyderabad (Deccan)		'219	'099	'120	'159	+013	'769	92'3	69'0	23'3	106'5	47'1	59'4	83'7	89'3	79'9	+1'3
	Bombay . . .		29'900	29'798	'102	29'845	+021	'821	86'3	75'2	11'1	93'7	59'1	34'6	81'2	83'6	80'0	+0'5
WEST COAST . . .	Karwar . . .		'907	'801	'106	'849	+017	'825	86'3	72'0	14'3	93'6	58'8	34'8	80'6	84'3	78'6	-0'1
SOUTH INDIA . . .	Salem . . .		'013	28'878	'140	28'951	+002	'819	93'5	70'5	23'0	102'0	56'1	45'9	83'7	89'9	80'2	+0'5
	Chitaldroog . . .		27'539	27'427	'112	27'485	+012	'789	87'4	67'0	20'4	98'4	53'9	44'5	79'3	81'6	76'5	+0'7
	Bangalore . . .		26'961	26'848	'113	26'910	+007	'798	84'9	63'6	21'3	94'9	50'1	44'8	76'7	82'3	73'5	+0'6
	Hassan . . .		'899	'801	'098	'856	+011	'816	83'1	61'2	21'9	93'9	45'9	48'0	76'8	79'9	71'4	-0'1
	Mysore . . .		27'453	27'336	'117	27'395	+010	'807	86'8	64'6	22'2	96'7	51'7	45'0	78'1	83'7	75'0	-0'1
	Madras . . .		29'906	29'792	1 4	29'852	+011	'803	91'3	74'6	16'7	104'3	60'1	44'2	86'1	85'9	81'6	-0'1

* Mean of 9 months.

II.

at 62 Stations in India, Burma, etc., for the year 1899.

TEMPERATURE, WET-BULB.				VAPOUR TENSION.					HUMIDITY.					CLOUD.				RAINFALL.		STATION.	METEOROLOGICAL PROVINCE.
Mean minimum.	Mean 10 hours.	Mean 16 hours.	Mean daily.	From minimum.	Mean 10 hours.	Mean 16 hours.	Mean daily.	Variation from normal.	From minimum.	Mean 10 hours.	Mean 16 hours.	Mean daily.	Variation from normal.	Mean 10 hours.	Mean 16 hours.	Mean daily.	Variation from normal.	Total rainfall for the year.	Heaviest rainfall during the year.		
74.5	78.5	78.6	77.2	*820	*905	*898	*874	-.008	87	79	76	81	-1	5.9	6.1	6.0	+0.5			Port Blair.	BURMA COAST AND BAY ISLANDS.
70.3	75.5	76.0	73.9	*733	*807	*773	*772	-.006	91	74	66	77	0	5.0	5.5	5.3	-0.1			Rangoon.	
72.8	76.3	76.1	75.1	*758	*837	*824	*807	+0.01	81	76	75	77	+2	4.7	4.9	4.8	-0.4			Diamond Island.	
73.0	77.3	77.0	75.8	*775	*852	*856	*827	+0.09	81	76	75	77	-2	4.9	5.1	5.0	-0.1	57.98	4.11	Cocos Island.	
70.9*	75.6	76.9	75.2*	*749*	*847	*865	*844*		88*	81	77	83*		4.9	4.7	4.8	+0.3			Akyab.	
68.0	74.1	74.9	72.3	*701	*790	*792	*761	+0.11	95	77	72	81	+2	4.1	4.2	4.3	-0.3			Chittagong.	BENGAL AND ORISSA.
68.5	74.0	74.0	72.2	*705	*770	*719	*731	-.005	91	69	58	73	-3	4.5	4.5	4.5	+0.2			Calcutta (Alipore).	
71.0	76.0	76.1	74.3	*758	*848	*830	*812	-.005	89	77	71	79	-1	5.4	5.0	5.2	+0.3			Saugor Island.	
70.5	76.7	77.2	74.8	*760	*855	*867	*827	+0.32	95	75	75	81	+1	5.1	5.0	5.1	+0.3			Faise Point.	
59.5	64.6	65.3	63.2	*464	*462	*438	*454	-.021	68	47	41	52	-5	4.6	5.3	5.0	+0.3			Hazaribagh.	GANGETIC PLAIN AND CHOYA NAGPUR.
66.2	71.9	73.0	70.4	*652	*722	*697	*690	+0.19	87	70	60	72	+2	2.8	2.4	2.6	-0.2			Darbhanga.	
61.4	69.1	70.7	67.1	*523	*566	*530	*539	-.032	76	51	40	56	-5	2.9	2.8	2.9	-0.3			Allahabad.	
55.4	62.5	63.7	60.5	*409	*451	*436	*432	-.034	72	52	44	56	-7	2.9	3.5	3.2	-0.7			Dehra Dun.	UPPER SUB-HIMALAYAS.
56.7	65.0	66.3	62.6	*444	*475	*415	*444	-.051	73	48	33	52	-7	2.1	2.2	2.2	-1.0			Roorkee.	
58.2	66.5	69.1	64.6	*453	*522	*507	*494	-.019	69	50	38	52	-6	2.7	2.9	2.8	-0.2			Meerut.	
57.8	65.0	68.0	63.6	*435	*463	*426	*441	-.043	63	44	30	45	-6	2.5	2.3	2.4	-0.3			Lahore.	
57.5	65.8	68.2	63.9	*445	*462	*429	*445		68	41	30	46								Lahore (Newshed)	
58.1	63.8	66.0	62.6	*437	*423	*384	*415	-.091	66	42	29	45	-14	2.3	2.6	2.5	-1.0			Ludhiana.	
53.7	63.4	65.0	60.7	*374	*441	*412	*409	-.016	64	44	34	47	-6	2.2	3.2	2.7	-0.5			Peshawar.	INDUS VALLEY AND N.W. RAJ-PUTANA.
57.6	68.0	72.0	65.9	*426	*500	*501	*476	+0.16	61	38	28	42	-2	1.3	1.5	1.4	-0.5			Jacobabad.	
65.2	72.7	75.0	71.0	*597	*696	*761	*685	+0.16	74	59	62	65	-1	2.3	1.9	2.1	-1.0			Kurrachee.	
57.5	66.2	68.2	64.0	*399	*449	*433	*427	-.037	54	36	29	40	-10	2.3	3.3	2.8	-0.7			Jaipur.	EASTERN RAJPU- TANA, CENTRAL INDIA AND GU- JARAT.
57.2	63.5	64.9	61.9	*397	*372	*342	*370		57	36	26	39		1.7	2.3	2.0				Udaipur.	
59.3	67.2	68.4	65.0	*423	*429	*351	*401	-.079	53	33	21	36	-10	2.1	1.9	2.0	-1.4			Deesa.	
60.8	66.5	66.7	64.3	*513	*480	*482	*491	-.029	86	52	48	62	-2	3.5	4.3	3.9	-0.7			Belgaum.	DECCAN.
59.9	66.2	67.7	64.6	*429	*426	*380	*412	-.081	57	36	26	40	-11	3.3	4.9	4.1	-0.7			Sholapur.	
60.1	65.2	66.5	63.9	*500	*423	*388	*437	-.048	80	33	32	50	-3	3.5	4.2	3.9	-0.5			Poona.	
59.1	67.7	69.6	65.4	*427	*442	*400	*422	-.070	56	35	26	39	-12	3.0	3.9	3.5	-0.3			Akola.	
57.5	63.7	64.8	62.0	*358	*371	*329	*353	-.113	49	34	26	36	-16	2.9	3.8	3.4	-0.7			Buldana.	
57.8	66.3	68.3	64.1	*391	*430	*383	*461	-.096	52	35	25	38	-15	2.6	3.5	3.1	-0.4			Khandwa.	
60.7	68.3	70.0	66.3	*455	*500	*473	*476	-.053	58	42	32	44	-10	3.5	4.8	4.2	-0.3			Nagpur.	
59.6†	68.3	70.4	65.7†	*442†	*490	*471	*455†		61†	40	31	43†		2.7	4.0	3.4				Nagpur (Sany Commr.'s Office).	
63.2	69.1	69.7	67.3	*525	*540	*491	*519	-.059	72	47	37	52	-9	2.8	4.2	3.5	-0.3			Hyderabad (Deccan).	
69.3	74.0	75.5	72.9	*651	*754	*780	*729	-.047	73	70	68	70	-6	3.3	3.1	3.2	-1.0			Bombay.	WEST COAST.
69.8	73.5	75.1	72.8	*712	*739	*752	*734	-.031	89	70	64	75	-3	3.1	3.3	3.2	-0.5			Karwar.	
68.4	73.2	74.6	72.1	*678	*688	*656	*674	-.008	90	60	48	66	-2	4.0	5.2	4.6	0			Salem.	SOUTH INDIA.
61.8	67.3	67.6	65.5	*496	*528	*470	*498	-.009	74	53	41	56	-2	4.4	4.9	4.7	-0.4			Chitaldroog.	
60.9	66.0	66.2	64.4	*514	*524	*462	*500	-.034	87	57	43	62	-4	4.0	4.9	4.5	-0.1			Bangalore.	
59.6	65.3	65.3	63.4	*504	*496	*461	*487	-.040	91	54	47	64	-5	5.2	6.3	5.8	-0.2			Hassan.	
62.0	67.1	67.1	65.4	*532	*530	*472	*511	-.038	86	54	42	60	-4	6.0	6.4	6.2	+0.7			Mysore.	
	75.7	76.4	75.1		*752	*784	*788	+0.004		61	64	74	0	4.9	4.8	4.9	-0.1			Madras.	

† Mean of 11 months.

Table

Abstract of Observations recorded at 10 A.M. and 4 P.M.

METEOROLOGICAL PROVINCE.	STATION.	Elevation of Bar-Cistern above sea level in feet.	PRESSURE.						TEMPERATURE OF AIR.									
			Mean of 10 hours.	Mean of 16 hours.	Mean daily range.	Mean daily pressure.	Variation from normal.	Mean reduced to S.L. and for gravity 45° Lat.	Mean maximum.	Mean minimum.	Mean daily range.	Highest maximum.	Lowest minimum.	Absolute range.	Mean 10 hours.	Mean 16 hours.	Mean daily.	Variation from normal.
SOUTH INDIA—concl.	Bellary . . .		28°452	28°315	*137	28°386	+°006	29°784	93°8	70°5	23°3	106°8	52°7	54°1	84°4	90°7	81°0	+0°4
	Cocanada . . .		29°879	29°754	*125	29°814	+°010	*776	91°2	75°1	16°1	110°2	58°5	51°7	85°2	88°2	82°4	+1°0
HILL STATION, BALUCHISTAN. HILL STATIONS, NORTHERN INDIA.	Quetta . . .		24°644	24°568	*076	24°598	+°015		75°0	44°2	30°8	98°9	10°6	88°3	66°6	71°8	58°8	+0°7
	Leh . . .		19°729	19°635	*094	19°688	+°024		53°6	28°0	25°6	86°2	-19°5	105°7	43°1	50°3	40°3	-0°9
	Srinagar . . .		24°913	24°821	*092	24°860	+°011		66°6	44°1	22°5	95°4	12°1	83°3	55°9	64°4	54°8	+0°5
	Kailang . . .	10,087	20°961	20°883	*078	20°929	?		56°0	31°1	24°9	83°3	-6°5	89°8	46°0	49°2	40°9	0
	Simla (Ridge). . .		23°124	23°073	*051	23°091	+°012		61°7	50°1	11°6	82°8	22°2	60°6	56°9	58°7	55°1	-0°4
	Chakrata . . .		*293	*236	*057	*257	+°004		64°7	49°7	15°0	81°6	21°1	60°5	59°6	59°4	55°8	0
	Ranikhet . . .		24°106	24°036	*070	24°059	+°007		68°6	53°9	14°7	89°1	27°2	61°9	63°4	64°8	60°3	+0°5
	Muktesar . . .		22°857	22°799	*058	22°828			65°0	48°4	16°6	85°6	22°5	63°1	58°9	60°3	55°6	
HILL STATIONS, CENTRAL INDIA.	Katmandu . . .	4,388	25°556	25°465	*091	25°509	?		77°3	53°7	23°6	94°8	29°4	65°4	68°2	72°4	61°3	-0°5
	Darjeeling . . .		22°991	22°927	*064	22°958	+°005		58°3	47°9	10°4	73°2	26°3	46°9	54°1	55°1	52°8	-0°1
	Mount Abu . . .		26°050	25°980	*070	26°011	-°001		77°5	62°9	14°6	93°0	37°7	55°3	72°4	75°5	69°7	+1°5
	Pachmarhi . . .		*459	26°368	*091	*411	+°014		81°4	61°1	20°3	100°2	30°3	69°9	75°6	79°6	70°9	+1°3
HILL STATION, SOUTH INDIA. EXTRA INDIA	Chikalda . . .	3,642	*350	*254	*096	*299	+°015		81°8	65°1	16°7	97°6	43°4	54°2	75°0	80°1	73°2	+1°9
	Wellington . . .		24°259	24°190	*069	24°225	0		72°2	51°9	20°3	79°5	36°1	43°4	68°2	67°2	60°8	-0°2
	Aden . . .		29°857	29°744	*113	29°797	+°023	*823	87°6	78°0	9°6	97°7	68°9	28°8	84°5	85°9	82°6	+0°4
	Perim . . .		*713	*599	*114	*652	+°016		90°1*	79°7*	10°4	101°5	71°4	30°1	85°7	86°4	81°1*	-0°3
	Minicoy . . .		*914	*821	*093	*866		*800	86°1			91°6			83°9	83°5		
	Zanzibar . . .	15	30°010	*894	*116	*952	+°009	*952	83°8	76°1	7°2	89°4	68°9	20°5	79°5	82°6	79°5	0
	Port Victoria (Seychelles). . .	181	29°996	*911	*085	*954	+°010	*893	82°5	75°5	7°0	86°9	69°9	17°0	81°3	81°7	78°8	-0°5

II—concl'd.

at 62 Stations in India, Burma, etc., for the year 1899—concl'd.

TEMPERATURE, WET-BULB.				VAPOUR TENSION,					HUMIDITY,					CLOUD.				RAINFALL.		STATION.	METEOROLOGICAL PROVINCE.
Mean minimum.	Mean 10 hours.	Mean 16 hours.	Mean daily.	From minimum.	Mean 10 hours.	Mean 16 hours.	Mean daily.	Variation from normal.	From minimum.	Mean 10 hours.	Mean 16 hours.	Mean daily.	Variation from normal.	Mean 10 hours.	Mean 16 hours.	Mean daily.	Variation from normal.	Total rainfall for the year.	Heaviest rain-fall during the year.		
62.8	66.9	68.9	66.2	.486	.449	.439	.458	-.091	64	38	21	45	-9	5.2	6.4	5.8	+0.8			Bellary.	SOUTH INDIA— concl'd.
71.4	74.3	74.5	73.4	.736	.712	.680	.709	-.054	83	59	52	64	-7	3.6	3.7	3.7	+0.1			Cocanada.	
38.4	51.3	53.0	47.6	.191	.242	.225	.219	-.030	62	37	30	43	-7	2.1	2.9	2.5	+0.3			Quetta .	
24.0	33.4	38.0	31.8	.119	.138	.151	.136	0	65	44	42	50	0	4.5	5.4	5.0	-0.4			Leh. .	HILL STATION, BALUCHISTAN.
42.2	53.0	60.8	52.0	.279	.428	.530*	.393*	+0.058	87	83	81*	81*	+7	4.2	5.0	4.6	+0.1			Srinagar.	HILL STATIONS, NORTHERN INDIA.
29.0	37.7	38.7	35.1	.164	.188	.170	.174	-.007	82	53	46	60	-2	4.8	6.4	5.6	+0.1	15.60	1.42	Kailang.	
43.7	47.7	49.1	46.8	.239	.258	.273	.256	-.032	61	51	51	54	-6	3.9	4.7	4.3	-0.8			Simla (Ridge).	
44.1	49.8	49.9	47.9	.254	.280	.283	.273	-.029	65	52	53	57	-7	3.4	4.7	4.1	-0.5			Chakrata .	
48.0	54.2*	55.1*	52.8*	.294	.328*	.338*	.324*	-.034	66	52*	50*	56*	-8	3.4	3.7	3.6	-0.9			Ranikhet.	
42.9	49.2	50.6	47.5	.240	.273	.290	.268		64	51	53	56		3.7	4.9	4.3				Muktesar.	
52.4	60.4	62.2	58.3	.415	.465	.464	.448	0	91	64	56	71	-1	3.7	4.7	4.2	-0.4	49.08	2.36	Katmandu .	
46.2	51.9	52.6	50.2	.335*	.385	.391	.379*	+0.014	93*	86	85	88*	+3	6.3	6.9	6.6	0			Darjeeling .	
53.4	58.0	59.3	56.9	.315	.334	.334	.327	-.038	53	43	37	44	-8	2.5	2.4	2.5	-1.2			Mount Abu .	HILL STATIONS, CENTRAL INDIA.
54.8	62.2	63.8	60.3	.385	.422	.428	.412	-.001	68	48	43	53	-4	3.3	4.1	3.7	-0.4			Pachmarhi	
56.5	60.8	62.9	60.1	.374	.381	.385	.380	-.052	59	46	39	48	-10	2.8	3.9	3.4	-1.0	23.97	4.06	Chikalda.	
48.9	57.5	58.6	54.9	.324	.370	.406	.367	-.025	81	54	62	66	-6	4.7	6.1	5.4	-0.4			Wellington .	HILL STATION, SOUTH INDIA.
70.9	75.0	73.8	73.2	.667	.747	.680	.698	-.042	70	63	55	63	-4	4.3	2.5	3.4	+1.0			Aden.	EXTRA INDIA.
73.7	76.9	77.0	75.8	.761*	.816	.809	.802*	+0.035	76*	66	64	68*	+4	2.9	2.3	2.6	+0.6			Perim.	
	77.2	76.8			.844	.835				73	73			3.5	4.0	3.8				Minicoy.	
72.1	74.4	74.5	73.7	.738	.789	.748	.758	-.034	82	78	67	76	-3	6.4	5.2	5.8	+1.0			Zanzibar.	
72.2	75.2	75.4	74.3	.749	.795	.796	.779	-.006	85	75	73	78	0	5.6	5.7	5.7	-0.5	90.53	7.54	Port Victoria (Seychelles).	

* Mean of 11 months.

EXPLANATION OF PLATES.

PLATE I.—A chart of India showing the 11 meteorological provinces and 57 districts of India.

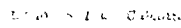
PLATE II.—A chart of India showing the normal average rainfall and the variation of the rainfall from the normal of the months of January and February 1899. This chart and the three following charts have been prepared to illustrate the data given in Table XX. These charts are drawn up in the same manner as the rainfall chart (Plate V) in the Monthly Weather Reviews of the year 1899.

PLATE III.—A chart of India showing the normal average rainfall and the variation of the rainfall from the normal of the months of March to May 1899.

PLATE IV.—A chart of India showing the normal average rainfall and the variation of the rainfall from the normal of the months of June to October 1899.

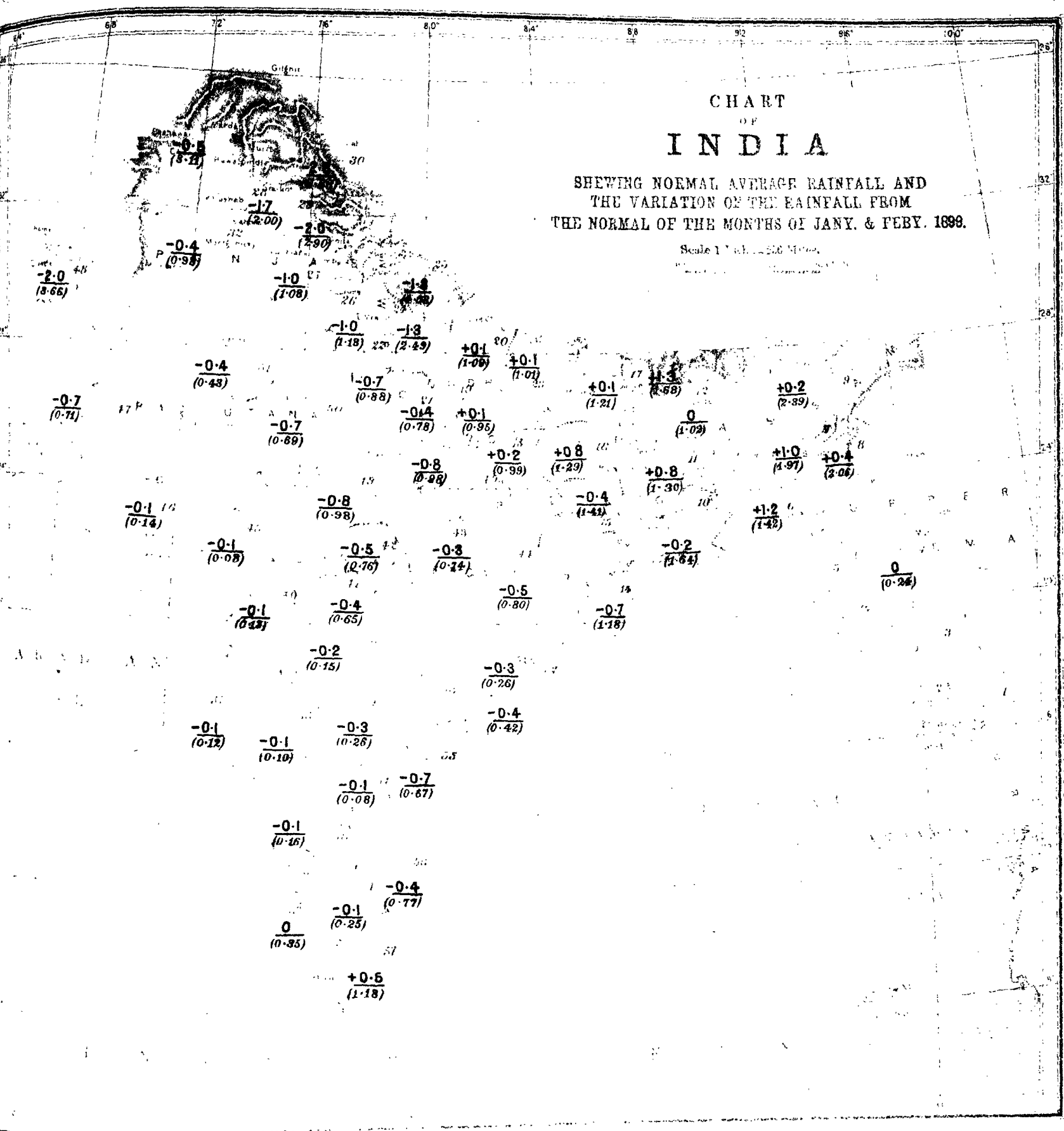
PLATE V.—A chart of India showing the normal average rainfall and the variation of the rainfall from the normal of the months of November and December 1899.

PLATE VI.—Chart showing the tracks of the more important cyclonic storms of 1899 in the Indian area during the south-west monsoon, a brief summary of which is given on pages 719 and 720.



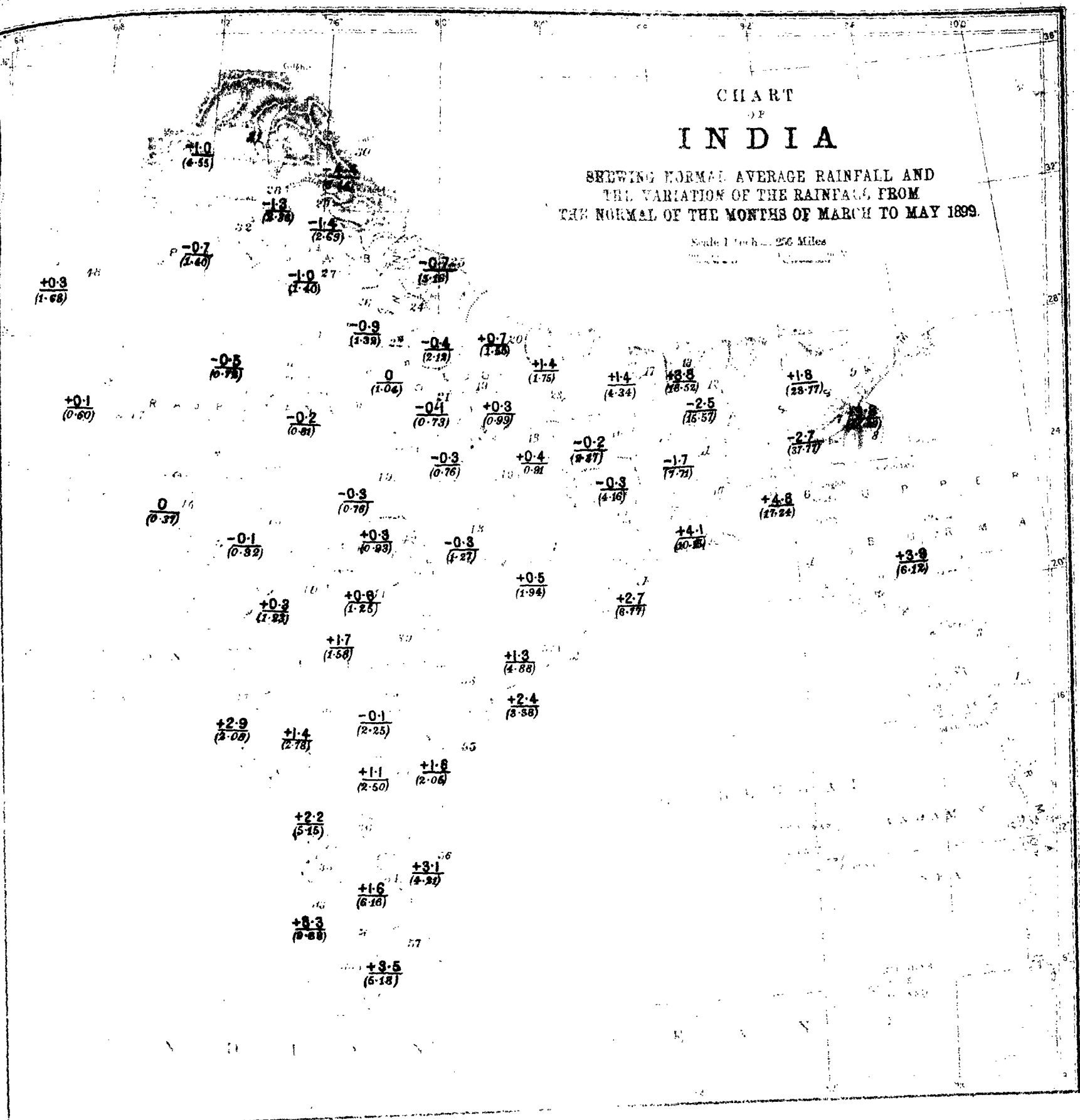
The name of the abstract and its author is entered by reference to the following list to the number given near the right hand boundary of each district (small standing red figures).

1. Trans-Gangetic	27. North Bihar	51. Madras	18. Baluchistan Hills
2. Lower Burma Delta	28. North Western Provinces, East	52. Madras do	19. Central India, East
3. Central do	29. South do	53. Madras South Central	49a. Do do
4. Upper do	30. North do	54. Mysore	50. Rajputana East, Central India
5. Arabian	31. North Western Provinces, Central	55. Assam	West
6. East Bengal	32. Do do West	56. Aikan	51. West Rajputana
7. Assam, Sarma	33. Do do East Salmantane	57. Bombay Deccan	52. Madras, East Coast, North
8. Do Hills	34. Do do West do	58. Hyderabad, North	52a. Do do do (a)
9. Do Bhamaputra	35. Do do do	59. Kashmir	53. Hyderabad, South
10. Delhi, Bengal	36. South East Punjab	60. Bihar	54. Madras, Central
11. Central do	37. South do	61. Central Provinces, West	55. Madras, East Coast, Central
12. North do	38. Central do	62. Do Central	56. Do East Coast, South
13. Bengal Hills	39. Punjab, Salmantane	63. Do East	57. Madras, South
14. Orissa	40. Do Hills	64. Gujarat	
15. Chota Nagpur	41. North Punjab	65. Kathiawar	
16. South Bihar	42. West do	66. Sind	



The following table gives the normal average rainfall for the whole of India and for the various provinces and districts, and also the variation of the rainfall from the normal for the months of January and February 1899. The numbers in parentheses show the difference between the actual and normal mean rainfall, and a negative sign indicates that it was in defect by the amount shown. The normal average rainfall is also given below in smaller figures, without and in parentheses, for each province and district, and can be at once ascertained by referring to the following list:

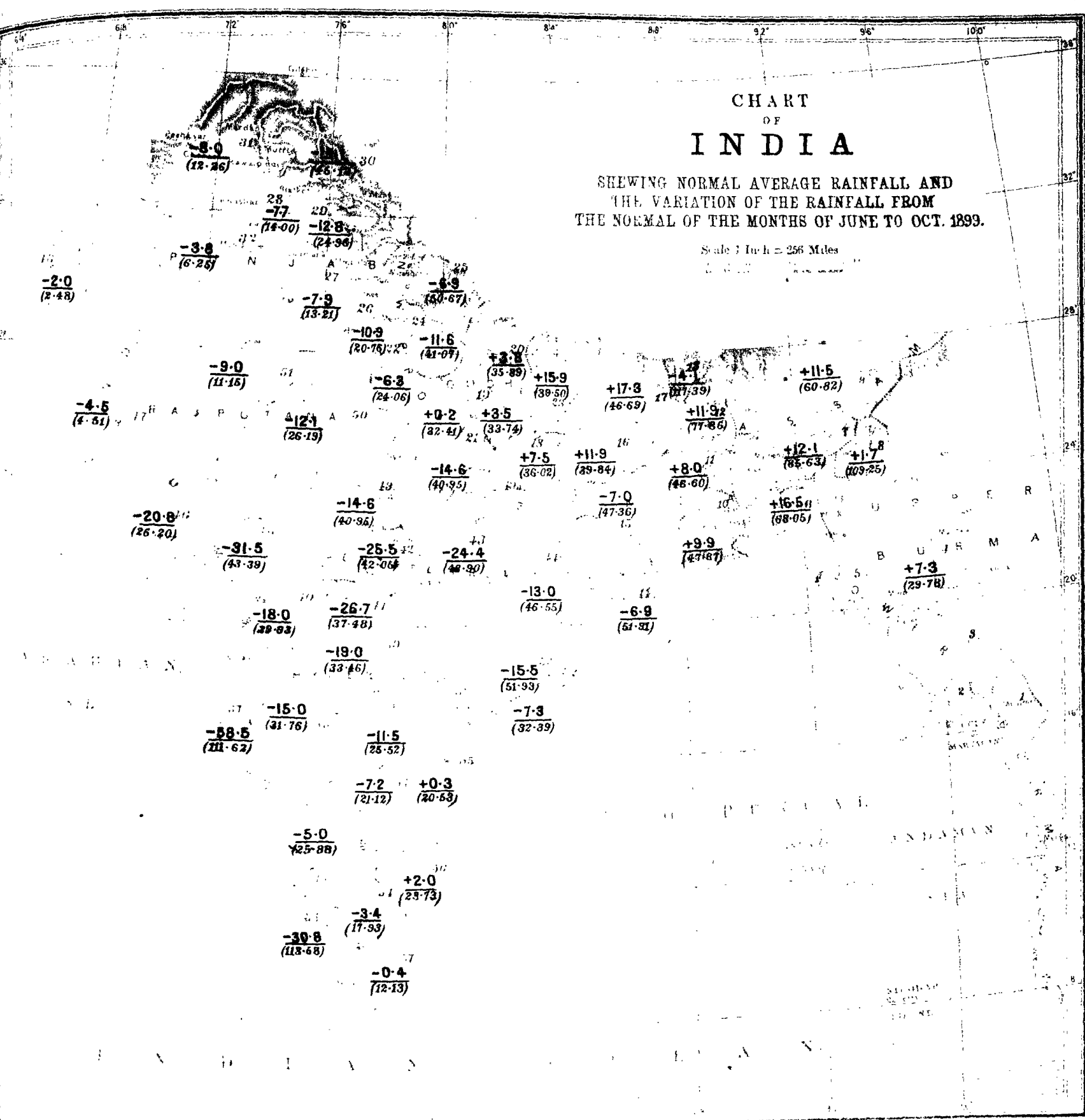
1. Punjab	17. North India, East	31. Central India, East
2. Do. Do. Do. Do.	18. Do. Do. Do. Do.	32. Do. Do. Do. Do.
3. Do. Do. Do. Do.	19. Do. Do. Do. Do.	33. Do. Do. Do. Do.
4. Do. Do. Do. Do.	20. Do. Do. Do. Do.	34. Do. Do. Do. Do.
5. Do. Do. Do. Do.	21. Do. Do. Do. Do.	35. Do. Do. Do. Do.
6. Do. Do. Do. Do.	22. Do. Do. Do. Do.	36. Do. Do. Do. Do.
7. Do. Do. Do. Do.	23. Do. Do. Do. Do.	37. Do. Do. Do. Do.
8. Do. Do. Do. Do.	24. Do. Do. Do. Do.	38. Do. Do. Do. Do.
9. Do. Do. Do. Do.	25. Do. Do. Do. Do.	39. Do. Do. Do. Do.
10. Do. Do. Do. Do.	26. Do. Do. Do. Do.	40. Do. Do. Do. Do.
11. Do. Do. Do. Do.	27. Do. Do. Do. Do.	41. Do. Do. Do. Do.
12. Do. Do. Do. Do.	28. Do. Do. Do. Do.	42. Do. Do. Do. Do.
13. Do. Do. Do. Do.	29. Do. Do. Do. Do.	43. Do. Do. Do. Do.
14. Do. Do. Do. Do.	30. Do. Do. Do. Do.	44. Do. Do. Do. Do.
15. Do. Do. Do. Do.	31. Do. Do. Do. Do.	45. Do. Do. Do. Do.
16. Do. Do. Do. Do.	32. Do. Do. Do. Do.	46. Do. Do. Do. Do.
17. Do. Do. Do. Do.	33. Do. Do. Do. Do.	47. Do. Do. Do. Do.
18. Do. Do. Do. Do.	34. Do. Do. Do. Do.	48. Do. Do. Do. Do.
19. Do. Do. Do. Do.	35. Do. Do. Do. Do.	49. Do. Do. Do. Do.
20. Do. Do. Do. Do.	36. Do. Do. Do. Do.	50. Do. Do. Do. Do.
21. Do. Do. Do. Do.	37. Do. Do. Do. Do.	51. Do. Do. Do. Do.
22. Do. Do. Do. Do.	38. Do. Do. Do. Do.	52. Do. Do. Do. Do.
23. Do. Do. Do. Do.	39. Do. Do. Do. Do.	53. Do. Do. Do. Do.
24. Do. Do. Do. Do.	40. Do. Do. Do. Do.	54. Do. Do. Do. Do.
25. Do. Do. Do. Do.	41. Do. Do. Do. Do.	55. Do. Do. Do. Do.
26. Do. Do. Do. Do.	42. Do. Do. Do. Do.	56. Do. Do. Do. Do.
27. Do. Do. Do. Do.	43. Do. Do. Do. Do.	57. Do. Do. Do. Do.
28. Do. Do. Do. Do.	44. Do. Do. Do. Do.	
29. Do. Do. Do. Do.	45. Do. Do. Do. Do.	
30. Do. Do. Do. Do.	46. Do. Do. Do. Do.	
31. Do. Do. Do. Do.	47. Do. Do. Do. Do.	
32. Do. Do. Do. Do.	48. Do. Do. Do. Do.	
33. Do. Do. Do. Do.	49. Do. Do. Do. Do.	
34. Do. Do. Do. Do.	50. Do. Do. Do. Do.	
35. Do. Do. Do. Do.	51. Do. Do. Do. Do.	
36. Do. Do. Do. Do.	52. Do. Do. Do. Do.	
37. Do. Do. Do. Do.	53. Do. Do. Do. Do.	
38. Do. Do. Do. Do.	54. Do. Do. Do. Do.	
39. Do. Do. Do. Do.	55. Do. Do. Do. Do.	
40. Do. Do. Do. Do.	56. Do. Do. Do. Do.	
41. Do. Do. Do. Do.	57. Do. Do. Do. Do.	
42. Do. Do. Do. Do.		
43. Do. Do. Do. Do.		
44. Do. Do. Do. Do.		
45. Do. Do. Do. Do.		
46. Do. Do. Do. Do.		
47. Do. Do. Do. Do.		
48. Do. Do. Do. Do.		
49. Do. Do. Do. Do.		
50. Do. Do. Do. Do.		
51. Do. Do. Do. Do.		
52. Do. Do. Do. Do.		
53. Do. Do. Do. Do.		
54. Do. Do. Do. Do.		
55. Do. Do. Do. Do.		
56. Do. Do. Do. Do.		
57. Do. Do. Do. Do.		



Explanation

The Chart gives the variations of the rainfall from the normal for a sufficient number of years to furnish a fair average. The country is divided into districts, and the meteorological conditions are fairly uniform, so that the mean rainfall for each district can be taken as the normal. The numbers in the month have been calculated, and the numbers are the staple crops similar in character, and the rainfall is given in the month. The difference between the actual and normal mean given in the centre of each division. A positive sign indicates that it was in excess, and a negative sign that it was in defect by the rainfall of the district of the month. A plus sign indicates that it was in excess, and a negative sign that it was in defect by the amounts indicated by the numbers to which the sign is attached. The normal average rainfall is also given below in smaller figures enclosed within brackets so that the percentage variation can be estimated. The name of the district can be at once ascertained by referring to the following list to the number given near the right hand boundary of each district in small slanting red figures.

1. Punjab	17. North Bihar	33. Madras, South Central	49. Central India, East
2. Do. Bengal, North	18. North Western Provinces, East	34. Do. Do. Central	50. Do. Do. West
3. Do. Do. West	19. North Bihar	35. Do. Do. East	51. West Rajputana
4. Do. Do. Central	20. North Bihar	36. Do. Do. West	52. East Coast, North
5. Do. Do. South	21. North Western Provinces, Central	37. Do. Do. East	52(a). Do. Do. (a)
6. East Bengal	22. Do. Do. West	38. Do. Do. East	53. Hyderabad, South
7. Assam, Surma	23. Do. Do. East	39. Do. Do. West	54. Madras, Central
8. Do. Hills	24. Do. Do. West	40. Do. Do. East	55. East Coast, Central
9. Do. Brahmaputra	25. Do. Do. Hills	41. Do. Do. West	56. East Coast, South
10. Deltaic Bengal	26. South East Punjab	42. Central Provinces, West	57. Madras, South
11. Central do.	27. South do.	43. Do. Do. East	
12. North do.	28. Central do.	44. Do. Do. West	
13. Bengal Hills	29. Punjab, Submontane	45. Gajpur	
14. Orissa	30. Do. Hills	46. Kathiawar	
15. Chota Nagpur	31. North Punjab	47. Sind	
16. South Bihar	32. West do.	48. Baluchistan Hills	



Explanation.

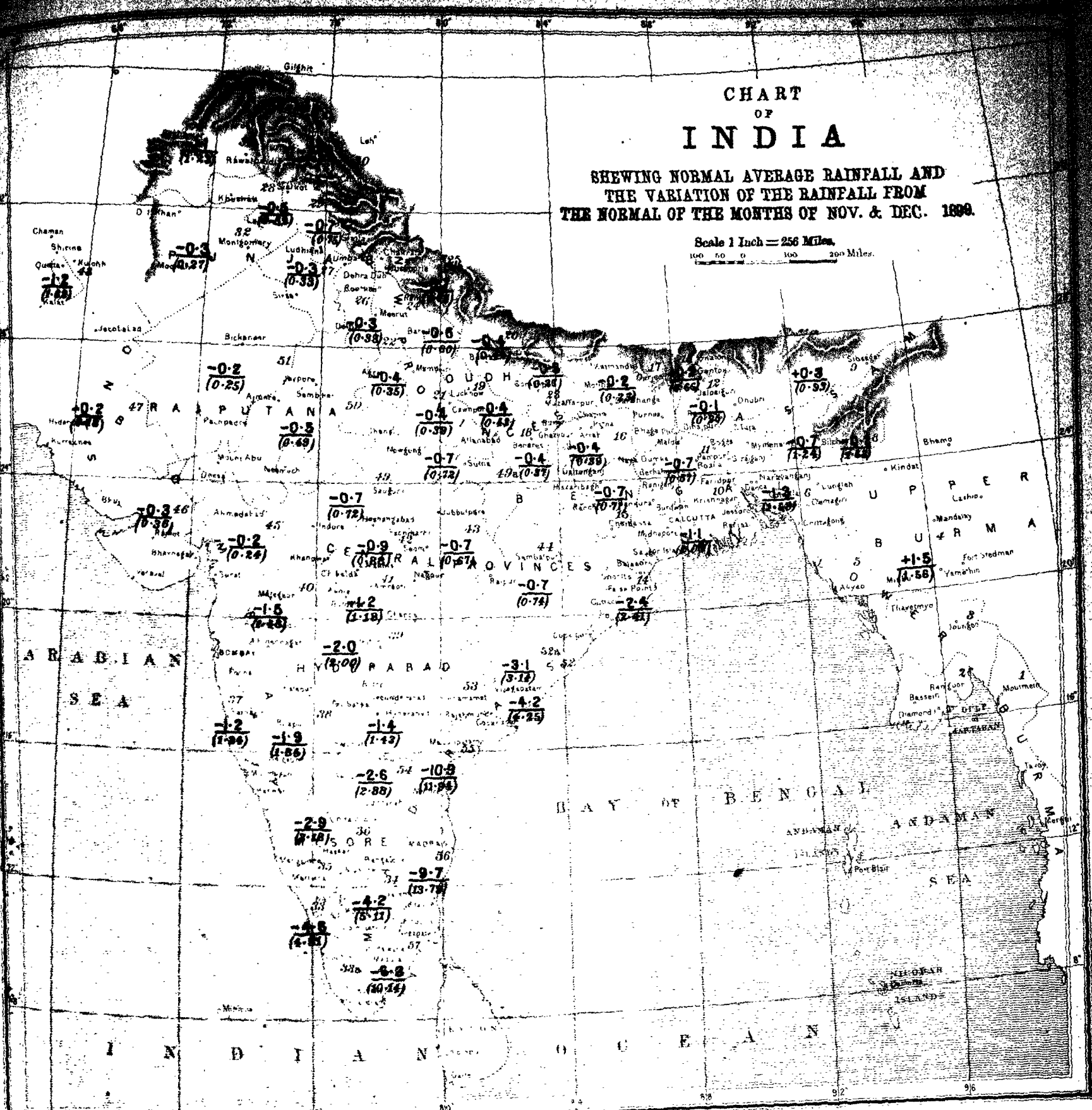
The above map shows the normal average rainfall and the variation of the rainfall from the normal over the whole of India and British India, with the exception of the North-West Frontier Province, where the meteorological conditions are fairly uniform, and the rainfall data have not been obtained for a sufficient number of years to furnish reliable statistics. The normal average rainfall for each district has been calculated from the meteorological conditions for the months of June to October, 1899, and the numbers shown on the map represent the difference between the actual and normal mean rainfall for the months of June to October, 1899, and the normal average rainfall for the months of June to October, 1899. A positive sign indicates that the actual rainfall was in excess, and a negative sign that it was in defect by the normal average rainfall. The normal average rainfall is also given below in smaller figures. The name of the district can be at once ascertained from the enclosed list of districts, the number being given near the figure of the district in small slanting red figures.

1. British India	21. North Bihar	41. Madras, North	51. West India, East
2. British India, North	22. North-West Frontier Province	42. Madras, Central	52. West India, Central
3. British India, South	23. North-West Frontier Province, West	43. Madras, South	53. West India, South
4. British India, East	24. North-West Frontier Province, East	44. Madras, North	54. West India, North
5. British India, West	25. North-West Frontier Province, West	45. Madras, Central	55. West India, Central
6. British India, South	26. North-West Frontier Province, South	46. Madras, South	56. West India, South
7. British India, East	27. North-West Frontier Province, East	47. Madras, North	57. West India, North
8. British India, West	28. North-West Frontier Province, West	48. Madras, Central	
9. British India, South	29. North-West Frontier Province, South	49. Madras, South	
10. British India, East	30. North-West Frontier Province, East		
11. British India, West	31. North-West Frontier Province, West		
12. British India, South	32. North-West Frontier Province, South		
13. British India, East			
14. British India, West			
15. British India, South			
16. British India, East			
17. British India, West			
18. British India, South			
19. British India, East			
20. British India, West			

CHART OF INDIA

SHEWING NORMAL AVERAGE RAINFALL AND
THE VARIATION OF THE RAINFALL FROM
THE NORMAL OF THE MONTHS OF NOV. & DEC. 1899.

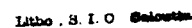
Scale 1 Inch = 256 Miles.
100 50 0 100 200 Miles.



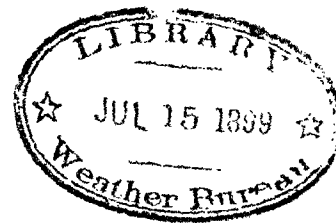
Explanation.

The Chart gives the variations of the rainfall of the month (to tenths of an inch) from the normal over the whole of India and Burma with the exception of Upper Burma, for which rainfall data have not been obtained for a sufficient number of years to furnish reliable and useful means. The country is divided into 57 areas, over each of which the meteorological conditions are fairly uniform, and the staple crops similar in character; and the means (both actual and normal for the month) have been calculated, and the numbers given in the centre of each division (usually with a + or - sign attached) give the difference between the actual and normal mean rainfall of the district of the month. A plus sign indicates that the rainfall was in excess, and a negative sign that it was in defect by the amounts indicated by the numbers to which the signs are attached. The normal average rainfall is also given below in smaller figures enclosed within brackets so that the percentage variation can be at once estimated. The name of the district can be at once ascertained by referring in the following list to the number given near the right hand boundary of each district in small slanting red figures.

1. Tenasserim	17. North Bihar	33. Malabar	49. Central India, East
2. Lower Burma Deltaic	18. North Western Provinces, East	33a. Travancore	49a. Do. do.
3. Central do.	19. South Oudh	34. Madras, South Central	50. Rajputana East, Central India
4. Upper do.	20. North do.	35. Coorg	West
5. Arakan	21. North Western Provinces, Central	36. Mysore	51. West Rajputana
6. East Bengal	22. Do. do., West	37. Konkan	52. East Coast, North
7. Assam, Surma	23. Do. do., East Submontane	38. Bombay Deccan	52(a). Do. do. (a)
8. Do., Hills	24. Do. do., West do.	39. Hyderabad, North	53. Hyderabad, South
9. Do., Brahmaputra	25. Do. do., Hills	40. Khandesh	54. Madras, Central
10. Deltaic Bengal	26. South East Punjab	41. Berar	55. East Coast, Central
11. Central do.	27. South do.	42. Central Provinces, West	56. East Coast, South
12. North do.	28. Central do.	43. Do., Central	57. Madras, South
13. Bengal Hills	29. Punjab, Submontane	44. Do., East	
14. Do., Hills	30. Do., Hills	45. Gujarat	
15. Do., Hills	31. North Punjab	46. Kathiawar	
16. Do., Hills	32. West do.	47. Sind	
		48. Baluchistan Hills	



GOVERNMENT OF INDIA,
METEOROLOGICAL DEPARTMENT.



MONTHLY WEATHER REVIEW, JANUARY 1899.

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BY

JOHN ELIOT, M.A., F.R.S., C.I.E.,

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OF INDIAN OBSERVATORIES.

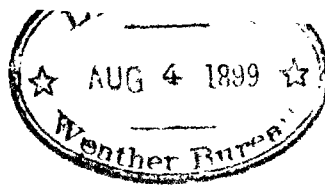
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MONTHLY WEATHER REVIEW, FEBRUARY 1899.

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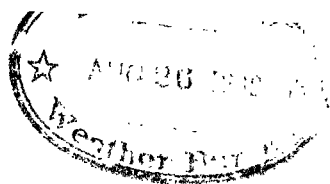
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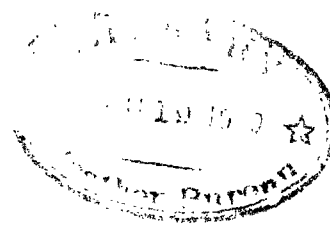
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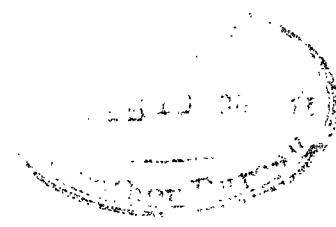
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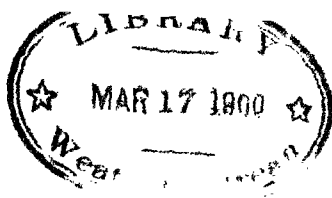
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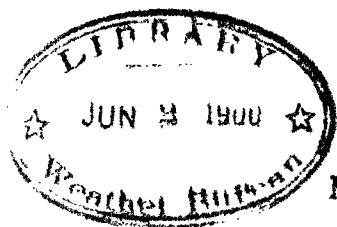
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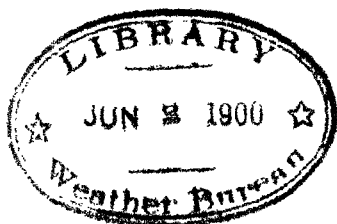
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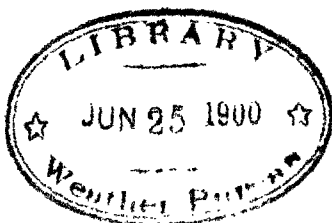
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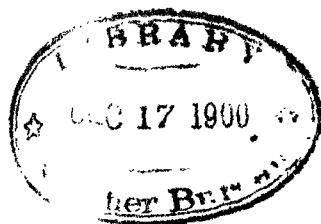
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